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Fishery Management Plan For High Seas Salmon

Alaska

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 674

Fishery Management Plan for the High Seas Salmon; Fishery Off the Coast of Alaska

AGENCY: National Oceanic and Atmospheric Administration, Department of Commerce.

ACTION: Publication of FMP for Salmon off Coast of Alaska.

SUMMARY: On May 18, 1979, the National Marine Fisheries Services published interim emergency regulations implementing the approved portion of the Fishery Management Plan (FMP) for the Alaska Salmon Fishery. Due to an inadvertance, the FMP was not published at that time. The FMP is set forth below in its entirety.

DATES: Nonapplicable.

FOR FURTHER INFORMATION CONTACT: Mr. Harry L. Rietze, Director, Alaska Region, National Marine Fisheries Service, (907) 586–7221.

Signed at Washington, D.C. this 31st day of May, 1979

Winfred H. Meibohm,

Executive Director, National Marine Fisheries Service.

Authority: 16 USC 1801 *et seq.*

Summary, High Seas Salmon Fishery off the Coast of Alaska, East of 175° East Longitude

North Pacific Fishery Management Council

The salmon troll fishery off the coast of Alaska has historically been conducted from the U.S./Canada boundary (Dixon Entrance) to Middleton Island in the Gulf of Alaska, with intermittent efforts to the west as far as the Kodiak Island region.

The troll fishery is the only major U.S. fishery on salmon currently conducted in the Fishery Conservation Zone (see exceptions as noted in Sec. 8.2). Many vessels engaged in the offshore troll fishery participate in other types of fishing for salmon in State of Alaska waters, and for halibut, crab, etc., both in Alaska waters and the Fishery Conservation Zone (FCZ).

This fishery management plan is designed to promote conservation of the ocean salmon resource while allowing utilization of its stocks for food production.

Target species in the troll fishery are chinook *(Oncorhynchus tshawytscha)* and coho *(O. kisutch)* salmon. Pink salmon *(O. gorbuscha)*, sockeye *(O. nerka)*, and chum *(O. keta)* salmon are caught in insignificant numbers compared to the commercial harvest of chinook and coho.

A recreational fishery is conducted almost entirely within inshore and coastal waters of the State of Alaska.

The most concentrated effort on troll salmon is conducted on the Fairweather Grounds, a congregating place for salmon from both Alaskan and non-Alaskan areas. The migratory nature of the salmon and the mixture of stocks makes the management of this fishery complex.

There is a lack of biological information concerning the salmon in the troll fishery off the coast of Alaska; all information, however, indicates that stocks of wild chinook from Alaska are depressed and that the conduct of the troll fishery offshore is thought to be detrimental to remaining Alaska wild chinook stocks. This same effect is likewise detrimental to stocks of wild chinook entering the fishery from outside Alaska, but the nonselective nature of fishing in a mixed-stock fishery such as this is unavoidable.

It has been determined that controlling the catch is necessary for the future well-being of the stocks in this fishery.

There has been a prohibition on net fishing in offshore waters off the coast of Alaska since 1952. It is the intention of this plan to continue that prohibition.

The plan is designed to allow only a directed troll and recreational fishing effort for salmon in the offshore waters. Salmon present in these waters are the object also of intensive fishing in inshore areas. The offshore catch is but a fraction of the total annual coastwide catch.

Chinook spawn in the larger rivers of the Alaska mainland, with 33 populations identified in Southeastern Alaska east of Cape Suckling. West of Cape Suckling, and not included in the area managed for the salmon troll fishery, chinook spawn in similar river systems including the Copper, Cook Inlet system, Nushagak, Kuskokwim, and Yuokon Rivers. The contribution to the troll fishery of fish from these areas appears to be insignificant.

Important contributions of stocks to the troll fishery originate in the Columbia and Fraser River systems as well as in some Oregon and Washington coastal streams.

Coho in this fishery are primarily of Alaskan origin, with coho populations occurring in most of the 2,000-plus freshwater streams in Southeastern Alaska east of Cape Suckling. Again, the contribution of coho to the troll fishery from areas west of Cape Suckling appears to be insignificant.

A major concern of fishery specialists is the addition of significant numbers of hatchery fish to waters hosting native stocks. The problem is to avoid creating a dependency on hatchery fish to the detriment of the wild fish. There are indications that increased open ocean fishing pressure stimulated by successful hatchery programs may have affected adversely wild coho stocks in Oregon.

Foreign troll effort (all Canadian) was regulated by a Reciprocal Fisheries Agreement (1977) and occurred outside the U.S. 12-mile zone.

Total ex-vessel value of the commercial troll salmon landings in Southeastern Alaska (1975–76) was $14.5 million.

The plan addresses all salmon in the offshore waters off the coast of Alaska east of 175 degrees east longitude to Dixon Entrance. This area, encompassing more than 2,000 miles of straight-line coast, includes stocks of all five species of Pacific salmon. The fishing area managed by specific reference in the plan is small in proportion to the total ocean area. Management of the region west of the longitude of Cape Suckling and outside the limits of the troll fishery has been through successive restrictions and prohibitions on net fishing (since 1952) and trolling (since 1973). These prohibitions effectively restrict offshore fishing to a troll fishery east of the longitude of Cape Suckling.

Life history features of all salmon are included in the plan and maximum sustainable yield estimates have been developed solely from past catch data for all species of salmon off the coast of Alaska, with further MSY calculations for the area in which the troll fishery is conducted. Those values are (Nos. of fish):

MSY east and west of Cape Suckling

Chinooka (West)—247–267,000 (East)—296–316,000
Sockeye (West)—4,549–12,142,000 (East)—808–894,000
Coho (West)—602–682,000 (East)—959–1,115,000
Pink (West)—12,236–15,314,000 (East)—9,164–11,604,000
Chum (West)—3,682–4,180 (East)—1,822–2,201

Provisions for enforcement, cooperative research and permit and financing requirements for participants are also included in this plan.

The number of boats involved in the troll fishery increased from the early 1900s to 1974, when the State of Alaska passed legislation (Limited Entry) setting a limit of 950 units of power gear in the troll fishery.

The record year in the troll fishery was 1937 when 846,000 chinook were landed. There has since been a general decline which leveled off in 1965; the fishery is now reasonably stable with annual catches of 250–350,000 chinook.

The record coho catch was in 1951 when two million fish were landed. The catch has fluctuated between 300,000 and one million fish yearly since the late 1950s. From 1971 through 1976 an average of only 15.8 percent of chinook and 6.4 percent of coho taken in Southeast Alaska were reported taken in offshore waters.

Regulations for the offshore troll fishery have been basically the same since the 1950s. Prior to Alaskan statehood in 1959, it was managed by the U.S. Fish and Wildlife Service; since 1959, regulation has been by the State of Alaska through enforcement of its landing laws. A minimum length of 28 inches for chinook salmon was set in 1977; waters inside the surfline are open year-round with local exceptions designed to provide individual stock protection; a maximum of four lines may be fished within the three-mile limit (no similar restriction in offshore waters) and, since 1957, outside waters have been closed to all species from November 1 to April 14.

Catch statistics show that of the approximately 2,000 boats landing fish in 1976 in Southeastern Alaska, boats over 27' in length (970) accounted for 85 percent of the salmon caught by trolling.

The troll fishery for coho is closed from September 30 to June 14. There is no minimum size limit. Since 1973, all waters west of the longitude of Cape Suckling have been closed to salmon troll fishing. The June 15 opening is considered unrestrictive as coho do not show in the fishery in any numbers until mid-July.

The limited entry provision proposed for this fishery is one management concept used to control participation.

Finally, there is a statement of intent and the method for review of the plan following approval by the Secretary of Commerce.

Proposed Management Regime

Objectives

(1) Control expansion of the salmon troll fishery in the Fishery Conservation Zone.

(2) Allocate the salmon resource among user groups without disrupting present social and economic structures.

(3) Regulate the catch of salmon to assure adequate escapement for spawning.

(4) Reduce the catch of salmon with potential growth to increase the poundage yield from the troll fishery.

(5) Make cost effective the public investment in the high-seas salmon fishery.

(6) Promote the eventual development of a Pacific coast salmon fishery management plan.

Measures

Proposed measures for the conduct of the salmon troll fishery include size, sex, area, seasons, and gear regulations which are complementary with existing State of Alaska regulations.

Limited entry will be used as a method of meeting the objective of controlling expansion of this fishery.

Seasons—(1) All waters open for chinook, chum, sockeye, and pink salmon between April 15 and October 31 with the following exception: ALL WATERS WEST OF THE LONGITUDE OF CAPE SUCKLING HAVE NO OPEN SEASON. (2) Coho season is open between June 15 and September 20 except: ALL WATERS WEST OF THE LONGITUDE OF CAPE SUCKLING HAVE NO OPEN SEASON.

Gear—(1) Fishing with nets for salmon is not permitted in the Fishery Conservation Zone east of Cape Suckling. West of Cape Suckling, existing small-scale net fisheries conducted at False Pass (South Peninsula), Cook Inlet, and the Copper River Delta will be allowed under this plan. (2) Commercial fishing in allowed only by troll in the Fishery Conservation Zone. (3) Sport fishing is to be conducted with only a single, hand-held or closely attended rod with not more than one artificial lure or two flies or two single hooks attached.

Area—Trolling for salmon is permitted east of the longitude of Cape Suckling to Dixon Entrance on the U.S./Canadian border and within the described Fishery Conservation Zone.

Size—(1) Chinook salmon must be at least 28 inches in length overall (23 inches measured from the mid-point of the cleithral arch if headed). (2) All fin-clipped salmon must be landed head-on. (3) All other salmon no length restriction.

Sex—No restrictions.

Limited Entry—Limited entry for the offshore troll fishery is proposed as outlined in the regulations section.

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2.0 Introduction

This plan is a management regime for ocean salmon off the coast of Alaska in response to the requirements of the Fishery Conservation and Management Act of 1976 (U.S. Public Law 94–265). It was developed at the direction of the North Pacific Fishery Management Council by a multi-agency team composed of members of the Alaska Department of Fish and Game (lead agency), the Washington Department of Fisheries, National Marine Fisheries Service, Alaska Commercial Fisheries Entry Commission, and industry.

2.1 *Goals and Objectives for Management Plan*

The Fishery Conservation and Management Act (FCMA) of 1976 sets forth in Section 2, Findings, Purposes and Policy, and Section 301, National Standards for Fishery Conservation and Management, a series of guidelines and principles which govern the development of fishery management plans for fisheries in the Conservation Zone. The Act calls for ". . . achieving, on a continuing basis, the optimum yield from each fishery" ((Sec. 301. (a)(1))). In Section 3., Definitions, optimum yield is defined as ". . . the amount of fish—(A) which will provide the greatest overall benefit to the Nation, with particular reference to food production and recreational opportunities; and (B) which is prescribed as such on the basis of the maximum sustainable yield from such fishery, as modified by any relevant economic, social, or ecological factor."

Thus defined, optimum yield management, along with the clarifying language in Sections 2 and 301 of the Act, requires consideration of a multiplicity of biological, economic, social, and ecological objectives. This is in essence the difficult task of defining a social function for fisheries management. It is however, a crucial factor in the development of a management plan, for there is no way in which the concept of optimum yield can be given any meaning without a clear specification of the relevant biological, social,and economic objectives to be served.

The management objectives of the High Seas Salmon Plan are:

(1) Control the expansion of the salmon troll fishery in the Fishery Conservation Zone.

(2) Allocate the salmon resource among user groups without disrupting present social and economic structures.

(3) Regulate the catch of salmon to assure adequate escapement for spawning.

(4) Reduce the catch of salmon with potential growth to increase the poundage yield from the troll fishery.

(5) Make cost effective the public investment in the high seas salmon fishery.

(6) Promote the eventual development of a Pacific Coast salmon fishery management plan.

It must be pointed out that these objectives cannot be totally accomplished by any plan for the FCZ alone and represent the Council's contribution to a set of total objectives for the fishery to be accomplished in concert with actions taken by the State of Alaska in their waters.

To that end this plan is formally considered by the Council an interim plan with a fully integrated 0–200 mile FMP planned for writing and development for the 1980 fishery.

2.2 *Operational Definitions of Terms Used*

A. *Determinants of Catch Levels.* 1. *Maximum Sustainable Yield* (MSY) is an average, over a reasonable period of time, of the largest catch which can be taken continuously by the *fishery* under current environmental conditions. It should normally be presented with a range of values around its point estimate.

The term *fishery* means:

a. One or more *stocks of fish* which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics.

b. Any fishing for such stocks.

The term "stock of fish" means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

Where sufficient scientific data as to the biological characteristics of the stock do not exist, or the period of exploitation or investigation has not been long enough for adequate understanding of stock dynamics, the MSY will be estimated from the best information available.

2. *Acceptable Biological Catch* (ABC) is a seasonally determined catch that may differ from MSY for biological reasons. It may be lower or higher than MSY in some years for species with fluctuating recruitment. It may be set lower than MSY in order to rebuild overfished stocks.

3. *Optimum Yield* (OY) may be obtained by a plus or minus deviation from ABC for purposes of promoting economic, social, or ecological objectives as established by law and public participation processes. Ecological objectives, where they relate primarily to biological purposes and factors, are included in the determination of ABC. Where ecological objectives relate to resolving conflicts and accommodating competing uses and values, they are included as appropriate with economic and/or social objectives.

OY may be set higher than ABC in order to produce higher yields from other more desirable species in a multispecies fishery. It might be set lower than ABC in order to provide larger individuals or a higher average catch-per-unit of effort.

B. *Determination of Domestic Annual Fishing Capacity and Expected Harvest.* 1. *Domestic Annual Fishing Capacity* (DAC) is the total potential physical capacity of the fleets modified by

logistic factors. The components of the concept are:

a. An inventory of total potential physical capacity defined in terms of appropriate vessel and gear characteristics (e.g., size, horsepower, hold capacity, gear design, etc.).

b. Logistic factors determining total annual fishing capacity (e.g., variations in vessel and gear performance, trip length between fishing locations and landing points, weather constraints, etc.).

2. *Expected Domestic Annual Fishing Harvest* (DAH) is the domestic annual fishing capacity modified by other factors which will determine estimates of what the fleets will harvest (e.g., how fishermen will respond to price changes in the subject species and other species, etc.).

These concepts should be placed in a dynamic context of past trends and future projections. For example, physical fleet capacity should not simply be last season's inventory of vessels and hold measurements (although this is appropriate for present interim planning), but also next year's projected movement into and out of the fishery. Vessels under construction should be included and an estimate of attrition made.

The determination of domestic annual fishing capacity and expected harvest should be made on the best available information.

C. *Determination of Foreign Allowable Catch* (FAC) The foreign allowable catch is determined by deducting the domestic annual expected harvest from the optimum yield (OY−DAH=FAC).

D. *Determination of Areas Fished.* 1. *Offshore Waters:* Those waters seaward of the three-mile territorial jurisdiction.

2. *Coastal Waters:* Those waters under State control from the surfline to the three-mile territorial limit.

3. *Inshore Waters:* Those waters inside the surfline including all bays, sounds and straits.

E. *Other.* 1. *Troll:* A method of fishing in which a line with hook attached is drawn through the water behind a moving boat.

2. *Fishery Conservation Zone (FCZ):* A zone contiguous to the territorial sea of the United States, the inner boundary of which is the territorial sea boundary (3 nautical miles) and the outer boundary of which is a line drawn 200 nautical miles from the baseline from which the territorial sea is measured.

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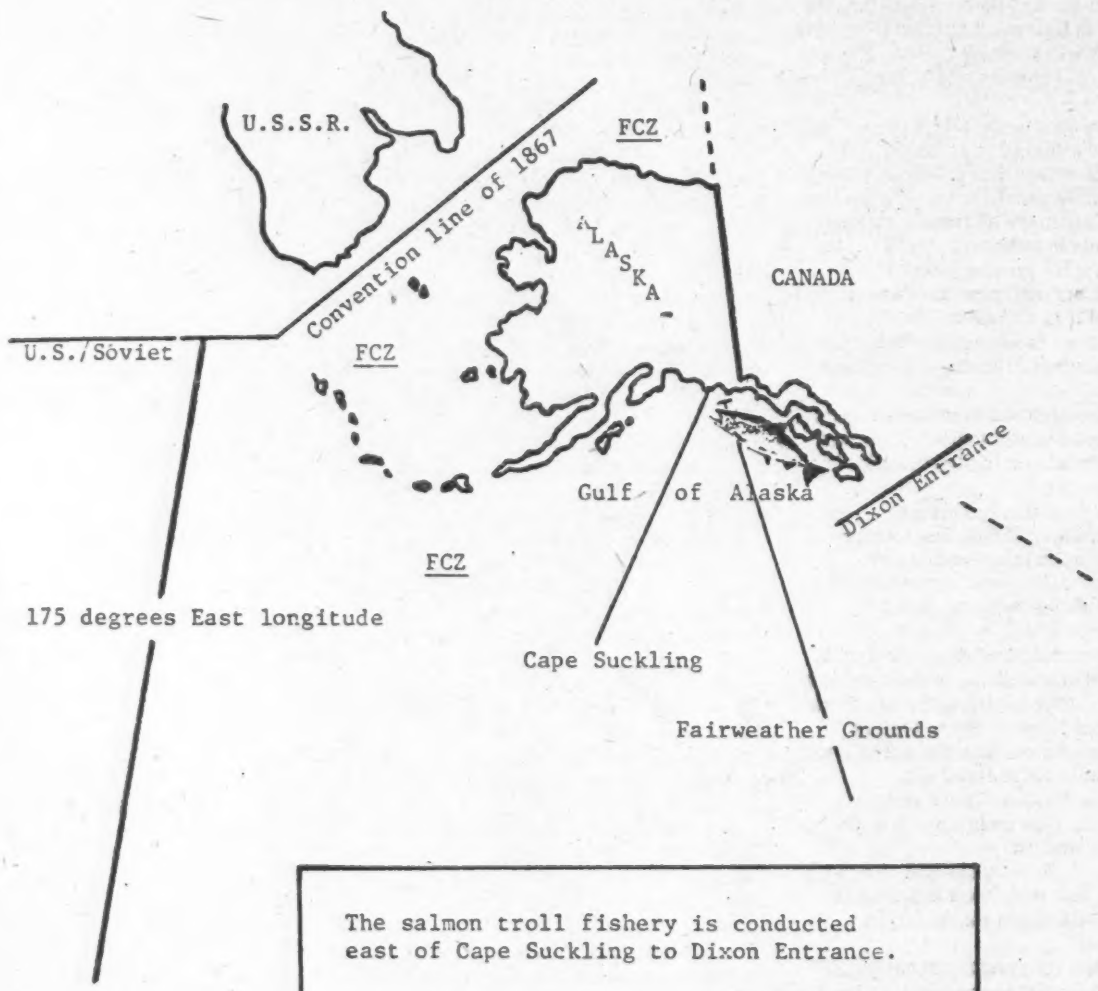
THE SALMON TROLL FISHERY OFF THE COAST OF ALASKA



The salmon troll fishery is conducted east of Cape Suckling to Dixon Entrance.

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3.0 Description of Fishery

3.1 *Areas and Stocks Involved* (See Appendix 3.0 for additional material)

The ocean area for this fishery management plan is the water off the coast of Alaska east of 175° East longitude within the 200-mile Fishery Conservation Zone.

Fishing effort in the FCZ west of 175° east longitude is the subject of a separate international fisheries agreement between the United States, Canada, and Japan.

State of Alaska fishery management areas contiguous to the Fishery Conservation Zone in these waters are the Arctic-Yukon-Kuskokwim, Bristol Bay, Chignik/Alaska Peninsula (Aleutian), Kodiak, Cook Inlet, Prince William Sound, northern Southeastern, and Southeastern Alaska.

The specific fishery addressed in this FMP is the salmon troll fishery conducted east of the longitude of Cape Suckling off Southeastern Alaska. Special reference is made to the Fairweather Grounds portion of that fishery. This area is a mixed-stock fishery for Alaskan and non-Alaskan salmon, of which chinook and coho salmon are the target species.

All five species of Pacific salmon are present in the troll fishery, but pink, chum and sockeye are caught in insignificant amounts compared to the numbers of chinook and coho taken commercially.

In Southeastern Alaska, native chinook and coho salmon occur from Cape Suckling to Dixon Entrance. The chinook spawn in the larger rivers of the mainland and their tributaries. The Taku, Stikine, Alsek, Unuk, Situk, and Chickamin Rivers host important spawning populations. Other river systems are known to produce chinook. Coho populations occur in most of the 2,000-plus anadromous fish streams in Southeastern Alaska. Fish from these areas are present in the troll fishery. Stocks of King salmon of non-Alaskan origin known to be present in the troll fishery include those from the Columbia River and Oregon-Washington coastal streams.

West of the longitude of Cape Suckling, chinook spawn in several major river systems including the Copper, Susitna, Kvichak, Togiak, Kuskokwim, and Yukon. As in southeastern Alaska, coho are found in numerous stream and river systems. (Catalog of Salmon Spawning Rivers, ADF&G, Rev., 1975.)

3.2 *History of Exploitation*

3.2.1 *Domestic Fishery*

3.2.1.1 *Description of User Groups*

East of Cape Suckling the troll fishery is the only domestic salmon fishery in the offshore area. Net fishing of all types has been prohibited in this area since 1952 (International North Pacific Fisheries Convention 1952; North Pacific Fisheries Act of 1954) [16 USC1021–1032] and with specific exceptions off the remainder of the Pacific Coast (including Canada) since 1956. Chinook are harvested mostly by the troll fishery, with small numbers taken by gillnets, purse seines, and the recreational fishery. Coho are caught in inshore waters by nets and trolling in nearly the same proportion. Recreational coho catches are relatively small and are mostly taken in the territorial waters. Pink, chum, and sockeye salmon are harvested by the same user groups; the bulk is taken by net fisheries inshore.

3.2.1.2 *General Description of Fishing Effort*

The number of boats in the Alaska troll fishery has generally been increasing since the early 1900s. The clear and protected waters of Southeast Alaska are conducive to trolling for chinook and coho. Trolling is not feasible in areas north and west due to lack of fish, murky waters, or the use of nets, the combination of factors preventing the growth of the fishery in those areas. After the 1973 season, the Alaska Board of Fish and Game made trolling illegal in all areas of the State of Alaska except east of Cape Suckling.

The early troll effort was conducted in inshore waters closer to spawning streams of the fish. As the number of fish decreased and the amount of effort increased, gear conflicts occurred; fishing effort gradually moved outward to coastal and offshore areas and it was during this expansion of area that, in 1952, several fishermen from the Pelican area caught fish on the offshore Fairweather Grounds. After a lapse of several years, during which good runs of salmon in inshore areas made it unnecessary to prospect offshore, fishermen again ranged offshore to the Fairweather Grounds and the fishery became established.

Effort in the troll fishery increased steadily until 1974 when the State of Alaska passed limited entry legislation holding effort to 950 units of power troll gear.

Based on the existing data, 187 individual boats fished the offshore troll fishery during the three-year period 1975–1977; the most that were on the grounds in any one year during that period was 118.

3.2.1.3. *Catch Trends*

The greatest recorded catch of chinook in Alaska was in 1937 when 846,000 fish were landed. From 1937 to the early 1960s there was a general decline in chinook catches. Since 1965 the catch has been reasonably stable between 250,000 and 350,000 fish per season (Figs. 12 and 13, Appendix 4.0).

The record catch of coho was in 1951 when 2.0 million fish were landed. Since the late 1950s the coho catch has fluctuated between 300,000 and 1,000,000 fish annually. In 1976 there were 220,000 chinook and 510,000 coho caught by troll gear.

In 1977 there were 272,000 chinook and 507,000 coho caught by troll gear. Table 1 shows that, respectively, 18.5, 1.8, and 1.6 percent of troll caught chinook, coho, and pink were taken in Council waters. These figures are equivalent to 8 percent for chinook, 0.5 percent for coho, and .02 percent for pink of the state total caught by all gear types (Table 2).

Table 3 shows the 10-year statistics for the 3 major species by troll gear and all gear types. Figure 1 depicts the trends of troll catches for these species.

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TABLE 1

NUMBER OF TROLL SALMON CAUGHT IN STATE AND COUNCIL WATERS--1977

Species	State Waters		Council Waters		Total
	NO.	(%)	NO.	(%)	
Chinook	221,508	(81.5)	50,251	(18.5)	271,759
Coho	497,680	(98.2)	9,155	(1.8)	506,835
Pink	276,733	(98.4)	4,455	(1.6)	281,188
Red	5,391	(94.5)	313	(5.5)	5,704
Chum	11,032	(94.5)	648	(5.5)	11,680
Total	1,012,344	(94.0)	64,822	(6.0)	1,077,166

Source: Prel. ADF&G Statistics, 1977

TABLE 2

NUMBER OF SALMON CAUGHT IN ALASKA BY SPECIES—1977

Species	All Gear State	Troll Gear State Water	(%)	Council Water	(%)	Total Troll	(%)
Chinook	626,723	221,508	(35.34)	50,251	(8.02)**	271,759	(43.36)
Coho	1,815,167	497,680	(27.42)	9,155	(.50)	506,835	(27.92)
Pink	28,582,428	276,733	(.97)	4,455	(.02)	281,188	(.99)
Red	13,717,737	5,391	(.04)	313	(*)	5,704	(.04)
Chum	6,204,094	11,032,	(.18)	648	(.01)	11,680	(.19)
Total	50,946,149	1,012,344	(1.99)	64,822	(.13)	1,077,166	(2.11)

*0.0022 percent ** 8.02 = (50,215/626,723)(100)

Numbers in () represent the percent of fish to the total of fish caught by all gear.

Source: Prel. ADF&G Statistics, 1977

TABLE 3

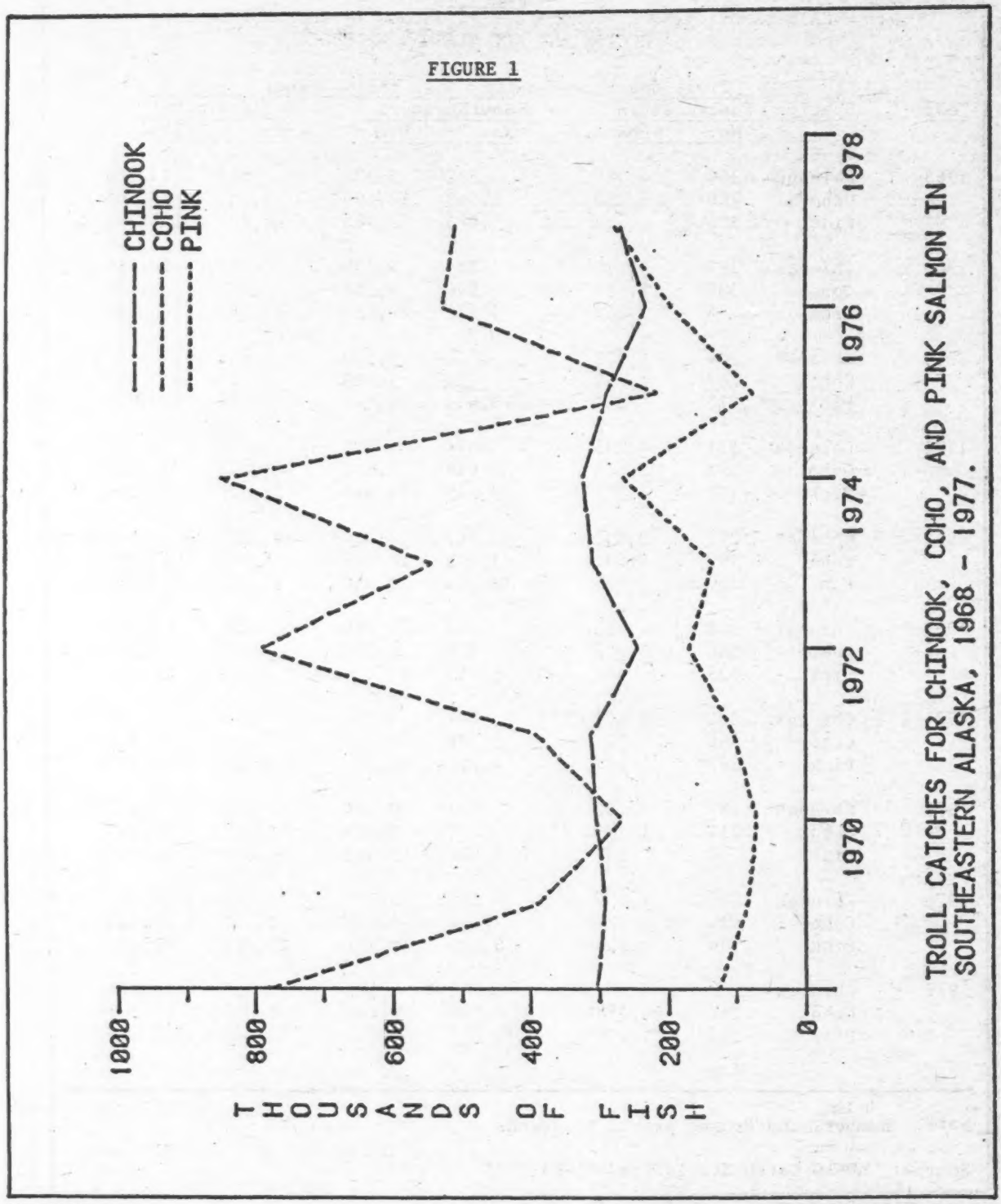
CATCHES OF CHINOOK, COHO, AND PINK SALMON IN THE SOUTHEASTERN REGION AND ALL ALASKAN WATERS *

Year	Species	Troll Gear Southeastern		All Gear Southeastern		All Gear All Alaska	
		No.	Lbs.	No.	Lbs.	No.	Lbs.
1968	Chinook	304	4,932	332	5,372	611	11,246
	Coho	780	6,158	1,543	12,190	2,751	20,968
	Pink	126	417	25,085	82,782	44,727	148,446
1969	Chinook	290	3,915	314	4,236	639	10,746
	Coho	389	2,836	596	4,354	1,133	8,034
	Pink	84	351	4,870	20,453	25,767	105,967
1970	Chinook	304	4,352	322	4,589	646	11,547
	Coho	267	1,899	759	5,823	1,527	11,898
	Pink	70	251	10,657	41,442	31,147	117,718
1971	Chinook	311	4,215	334	4,529	662	11,972
	Coho	391	2,674	914	7,137	1,448	11,459
	Pink	105	352	9,345	34,414	23,528	86,260
1972	Chinook	242	2,852	287	3,376	553	9,973
	Coho	792	4,891	1,509	10,586	1,831	13,035
	Pink	167	535	12,400	38,468	15,921	59,969
1973	Chinook	308	4,283	344	4,749	551	8,917
	Coho	540	3,806	836	6,161	1,457	9,837
	Pink	135	448	6,455	23,424	9,802	36,610
1974	Chinook	322	4,377	347	4,744	558	9,290
	Coho	846	5,722	1,278	9,413	1,861	12,820
	Pink	263	950	4,889	19,271	9,859	40,072
1975	Chinook	287	3,792	301	3,974	455	7,165
	Coho	214	1,295	427	3,084	1,014	7,745
	Pink	77	249	4,027	15,552	12,984	49,969
1976	Chinook	231	2,954	242	3,099	533	8,601
	Coho	525	3,671	824	6,355	1,432	10,644
	Pink	194	720	5,329	23,351	24,751	102,401
1977	Chinook	272	3,979	291	4,199	627	12,071
	Coho	507	4,158	945	8,247	1,815	15,362
	Pink	281	1,195	13,838	67,865	28,582	129,529

*Note: Numbers and Pounds are in thousands.

Source: ADF&G Catch Statistics. 1968-1977

FIGURE 1



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3.2.1.4 *Description of Vessels and Gear Employed*

Commercial trolling in Southeastern Alaska commenced in Ketchikan around the turn of the century with mechanically powered vessels entering the fishery in 1910. Power gurdies came into use in the early 1920's and later, the use of ice and refrigeration to maintain quality of unprocessed catch over extended periods of time lengthened the amount of time a commercial troller could spend fishing before returning to port.

The 2,076 commercial trolling vessels that landed fish in 1976 (power troll, 801; hand troll, 1,275) may be divided into two categories by size and area fished. The 1,106 boats under 27 feet in length do not fish in outside waters; the total troll catch by these fishermen is about 15 percent of the total.

The remainder of the catch was landed by 970 boats over 27 feet in length; the majority are power trollers which can fish for 10–14 days before delivering to a buyer. These boats are often highly mobile, fully equipped electronically, and very seaworthy.

There is no standardization of vessel types in this fishery; an endless variety of small, medium, and large size vessels participate.

3.2.2 *History of Foreign Exploitation* (3.2.2.1.–4.)

The foreign troll effort in the waters off Alaska has historically been Canadian. In some years of predicted large runs of albacore tuna *(Thunnas alalunga)* or salmon elsewhere on the coast, the Canadian effort off Alaska is minimal. In other years as many as 30 Canadian boats have fished in the offshore waters. In 1968 a total of 18,168 chinook, 1,732 coho, and 853 pinks was taken by Canadian boats that spent 1,048 boat days off Alaska. In 1976 there was no reported catch by Canadian trollers off Alaska (Annual Summary of British Columbia Catch Statistics 1976). This is thought to be in error on the basis of confirmed sightings of Canadian vessels on the Alaska fishing grounds by American fishermen.

3.3 *History of Management*

3.3.1 *Management Institutions, Policies, Jurisdiction*

Prior to statehood in 1959, management of salmon within 3 miles of the coast and all inshore waters of Southeast Alaska was under jurisdiction of the U.S. Fish and Wildlife Service. Regulations were established for the territorial waters in Washington, D.C., primarily to comply with Pacific coast states and Canadian regulations. Since statehood the Alaska Board of Fish and Game (now the Board of Fisheries) has set policy and regulations in accordance with proposals by the Alaska Department of Fish and Game, local advisory boards, and individuals. The Department of Fish and Game is responsible for in-season management, research, and implementation of regulations. The State and the Board of Fisheries exercise de-facto jurisdiction in the Pacific ocean waters beyond 3 miles under the terms of landing laws and other licensing requirements of U.S. Nationals. Due to disparities in regulations between the U.S. and Canada enforcement of Alaskan regulations pertaining to Canadian vessels in the contiguous zone has been generally ineffective.

Recognition of the coastwide nature of the management problems of chinook and coho led to the consideration of possible solutions initially under the auspices of the Pacific Marine Fisheries Commission (PMFC). The forum for coordinating both research efforts and ocean salmon fishery management regulations has been the PMFC Salmon-Steelhead Committee. This committee consists of fishery scientists from each member state (California, Oregon, Washington, Idaho, and Alaska).

3.3.2 *Domestic*

3.3.2.1 *Measures Employed to Regulate Fishery*

Regulations for the troll fishery have remained basically the same since the 1930's. In 1977, a 28-inch minimum total length size limit for chinook was imposed. Coastal and offshore waters are open to trolling from April 15 to October 31. Waters inside the surfline are open to trolling year-round with local exceptions to provide individual stock protection and conform to gillnet seasons (Alaska Commercial Fishing Regulations Finfish 1977). A maximum of four lines may be fished inside the 3-mile territorial limit. Beyond the 3-mile limit there is no restriction on the number of lines used.

The troll fishery is open to the taking of coho from June 15 to September 20. There is no minimum size limit for coho. In some years area closures are necessary to comply with gillnet closures for local stock protection.

3.3.2.2. *Purpose of Measures*

The 28-inch total length minimum size limit and the winter closure of offshore and coastal waters are intended to restrict the harvest of immature stocks of chinook salmon that have remaining growth potential. The offshore and coastal winter closure is basically of little or no consequence as weather conditions are more restrictive than the regulatory season. The coho season is unrestrictive because coho usually do not appear in the troll catch in substantial numbers prior to July 15 or after September 20. The four-line limit for troll vessels is imposed only in Alaska waters. Elsewhere on the coast the line limit is six lines; in some jurisdictions there is no line limit. Many Alsaka resident trollers have more than four lines on board their boats and will fish with all their lines when outside State jurisdiction.

The purpose of limited entry as a management tool is to promote the conservation and sustained yield management of the fishery resource and the economic health and stability of commercial fishing. Without limited entry levels of participation many fisheries have impaired or threatened to impair the economic welfare of the fisheries, the overall efficiency of the harvest, and the sustained yield management of the fishery resources.

3.3.3 *Foreign* (3.3.3.1, 3.3.3.2)

The foreign salmon troll effort in this fishery has been Canadian, has been regulated by a Reciprocal Fisheries Agreement, and occurred outside 12 nautical miles.

3.3.4 *Effectiveness of Management Measures*

Ideally, the management of any fishery should be focused on optimum escapement and yield from the resource. While inshore and coastal regulations have decreased the take of chinook salmon in inside areas, the effort in offshore waters has increased, thereby partially nullifying any intended benefits from inshore and coastal troll or net fishery curtailment. The 26-inch minimum size limit was intended to restrict the take of immature chinook salmon that have reared in the ocean for only two years under the concept that these fish would then be available for harvest in subsequent years. However, the increased effort in areas where small fish predominate has reduced the intended benefits of the minimum size limits because of the release and subsequent mortality of undersized chinook (shakers) that are inadvertently caught by troll fishermen.

This history of size restrictions in the troll fishery shows that prior to 1971, the legal length limit for chinook was 26 inches (fork lengh); fork length was changed to total length commencing with the 1972 season and remained at 26

inches total length until the 1977 season when the 28-inch total length (head-on) measurement was adopted.

The minimum size limit was increased to 28 inches for the 1977 season to provide further protection of immature chinook.

4.0 Biological Descriptors

4.1 *Life History Features*

Five species of Pacific salmon are off Alaska—pink, chinook, coho, chum and sockeye—and all have somewhat similar life histories. They spawn in fresh water from late summer to late autumn and die soon after. The eggs are deposited in gravel and remain until they emerge as fry in late winter or early spring. The fry of some species go to sea almost immediately, but in other species the freshwater period may vary from a few weeks to one or more years.

The ocean life is one of feeding and rapid growth. During the ocean residence the color is metallic blue on the top, with black spots or specklings, and silvery on the undersurfaces.

As the fish enter fresh water a red color appears on the chinook, sockeye, and coho; chum salmon acquire a "calico" banding and pink salmon turn a mottled brown. Males of all species develop a distinctive "kype" or elongated nose.

The salmon are placed in the genus *Oncorhynchus* and are characterized by a comparatively large anal fin with 13–19 rays. (By comparison, trout and char have 8–12 rays.)

Approximately one-third and two-thirds of Southeastern Alaska coho salmon, respectively, have 3- and 4-year life cycles. The 3-year old fish spend 1 year and the 4-year old spend 2 years in freshwater. Both migrate to sea as smolts in the spring; the 3-year old fish migrate as age 1+ smolts at the beginning of their second year and the 4-year old fish migrate as age 2+ smolts at the beginning of their third year. A small percentage of Southeastern Alaska coho are 5-year old fish having spent 3 years in freshwater and migrating to sea as age 3+ smolts at the beginning of their fourth year. Ecological characteristics of freshwater nursery areas that influence growth of fry and fingerlings apparently determine if seaward migration occurs in the second, third, or fourth year of life (Crone and Bond, 1976). In 1969 and 1970 age determinations on a 5,406 fish sample of adult coho from purse seine, troll, and gillnet fisheries in Southeastern Alaska revealed that 27, 64, and 9 percent respectively, were 3-, 4-, and 5-year-old fish (Marriot and Gray, 1970).

Regardless of their total age, coho are generally available to the troll fishery only in their final year of life as they approach maturity. This is during the summer and early fall after spending one winter in ocean nurseries.

Ninety-five percent of Southeastern Alaska chinook salmon smolts migrate seaward after rearing in freshwater for one year. The remainder migrate after two years. Alaska male chinook salmon mature after 1 to 5 years at sea, while females mature after 3 or 4 ocean years (Kissner, 1977). Chinook are available to various troll fisheries for up to 5 years but cannot be legally landed until the latter part of their second ocean year when they exceed 28 inches total length. Discrete migration patterns of fish after leaving the freshwater environment are unknown.

Adult sockeye migrate in early summer from salt water back to their freshwater stream of origin. While at sea the sockeye is bright and silvery; upon entering freshwater, the adult acquires the characteristic red coloration. The maturation process takes from one to two months. After spawning, the eggs develop and the fry will spend one or more years in freshwater before migrating to sea as smolts. After two to four years in saltwater, mature fish will weigh from four to eight pounds. In the fourth, fifth or sixth year, the mature fish will return to freshwater to spawn.

Pink salmon mature at two years of age. Following the freshwater spawning and incubation and growth to fry stage, the outmigration occurs during early spring and the fish spends one winter in saltwater, returning as the smallest of Pacific salmon with an average weight of some three pounds. It is the most abundant salmon in Alaska, and the most affected by natural, cyclic fluctuations.

Chum salmon exhibit similar spawning and early life stage characteristics similar to pink salmon. The principal difference occurs after outmigration of fry to the ocean environment where they spend three to four years before returning to spawn.

4.2 *Stock Units*

For purposes of management in terms of the Council's jurisdiction in waters where intermingling of both Alaskan and non-Alaskan chinook and coho occurs, these stocks must be considered as a unit because present knowledge is not sufficient for the management of discrete stocks throughout their range.

In general, native and hatchery chinook from the following areas are known to make contributions to the Alaska troll fishery: California, Columbia River, Washington, and Oregon coastal streams, Puget Sound, northern and southern British Columbia including Vancouver Island, and Southeastern Alaska.

Fish from all areas intermingle and constitute the fishery against which the troll effort is directed. Nearly 99 percent of the chinook troll landings from the offshore area come from the Fairweather Grounds (Table 13, Appendix 4.0).

This averages 15.8% of the total Alaska troll landings in numbers of fish (Table 12, Appendix 4.0).

Troll landings of coho in Council waters average only 6.4 percent of the total Alaska coho troll catch.

4.3 *Catch and Effort Data Sources*

Prior to statehood, catch and effort data recorded for the troll fishery was lacking in detail necessary for effective management. Since statehood, concerted efforts have been made to improve all data gathering functions of the Alaska Department of Fish and Game. At present, the available data includes numbers of boats and landings, and catch (in numbers and pounds) by species, statistical area, and week. In addition, effort in numbers of boats by statistical area is recorded by Department of Fish and Game personnel during overflights along the outside coast from Cape Muzon to Lituya Bay.

4.4 *Survey and Sampling Data*

From 1971 to 1974 a troll logbook program was conducted under the auspices of the Alaska Department of Fish and Game's Ocean Troll Fishery Project to determine catch by fishing location, hours fished per day, and number of undersized chinook caught by time and area. In 1976, the Alaska Trollers Association re-established a troll logbook program. In 1973, a port sampling program was initiated in three major ports of landing: Sitka, Pelican, and Craig. Information has been gathered concerning age-class structure of the troll catch, stock contributions from hatcheries, migration routes of maturing salmon, and relative frequency of stock contributions under mark-sampling programs funded by the National Marine Fisheries Service's Columbia River Fisheries Program and the North Pacific Fisheries Management Council.

Attempts have been made to establish escapement trends for the major chinook and coho streams in Southeastern Alaska. Because of variable water conditions (turbidity, etc.) as well as the inaccessibility of

many of the rivers, some of the survey results are not comparable. However, surveys of river systems for which data are comparable clearly demonstrate the decline in Southeastern Alaska chinook stocks (Table AI–4). Because of the dynamic nature of the stocks in the troll fishery it is necessary that these programs be continued and refined in order to achieve effective management.

4.5 *Habitat*

Because of the anadromous nature of salmon, it is essential that freshwater and estuarine habitat protection be given primary consideration in any plan designed to achieve sustained yield. The loss in potential production from the destruction of spawning environment through the construction of dams, industrial development, and poor logging practices cannot be completely offset by fishery restrictions or artificial production. The decline of the chinook catch in the Alaskan ocean troll fishery since the 1930's has been correlated with hydroelectric dam construction on the Columbia River; some upriver stocks in that system have been lost completely (Pacific Fisheries Management Council 1977). The decline in natural fish together with a relatively stable troll fishery demonstrated an increased reliance on hatchery-produced chinook.

The loss of spawning and rearing habitat through poor logging practices, urbanization, and industrial pollution in Southeastern Alaska will jeopardize sustained yield from coho. Some streams that presently support coho will undoubtedly suffer adverse effects from continued misuse of the environment. Information on specific streams or particular habitat problem areas currently is limited. There are studies being conducted by the Alaska Department of Fish and Game that should provide useful data in this regard. They are currently cataloging Southeastern Alaska streams to advise the U.S. Forest Service during development of their comprehensive land use plans. There are a large number of streams involved and these assessments are not yet complete. Also, ADF&G intends to closely monitor the effect on the Keta River of the access road that will be constructed by U.S. Borax for the proposed molybdenum mine.

Further development of land use-oriented industries in the States of Washington and Oregon and in the Province of British Columbia may cause further reduction in the numbers of chinook available to Alaskan fishermen. However, the present status of these stocks cannot be solely attributed to lost environment and, as with the Southeastern Alaska native chinook stocks, can be attributed as well to the fisheries which intercept these stocks.

4.6 *Ecological Relationships*

The ecological relationships of principal concern to salmon off Alaska are embedded in food chain relationships: i.e., marine mammals (sea lions) eat salmon which eat herring (or krill or needlefish) which eat plankton which need nutrient energy, etc. Direct food chain relationships involving salmon are poorly understood. Several applied research projects address (to a degree) "ecological relationships and salmon" but none present a very clear understanding of the total picture.

A troll logbook program being conducted under a cooperative agreement between the Alaska Trollers Association, the Alaska Department of Fish & Game, the Alaska Sea Grant Program, the University of Alaska, and the National Marine Fisheries Service, NPFMC should eventually result in better information regarding feed abundance and type. Preliminary data indicates that salmon feed primarily on needlefish and krill in the FCZ and on herring in inside waters. Several forage fish studies have been conducted off Alaska which deal with the distribution, abundance, and biology of herring, capelin, euchelon, candlefish, and krill. As an example, the ADF&G conducts continuing studies of herring abundance and although these studies relate specifically to the herring fishery, they should be useful in assessing some food chain relationship of salmon.

The Outer Continental Shelf/ Environmental Assessment Program (OCSEAP) has also conducted forage fish studies off Alaska, but primarily for the area north and west of Cape Suckling and principally with little conclusive data regarding salmon.

The Marine Mammal Protection Act of 1972 (Pub. L. 92–522) imposed a moratorium on the taking of marine mammals and further preempted State management authority over marine mammals in favor of Federal management. The Sea lion population has increased substantially since that moratorium went into effect. Sea lions prey on salmon and this has an effect on salmon stocks. Sea lions also physically interfere with some salmon fishing operations.

4.7 *Quality of Data*

The domestic catch in numbers and pounds of fish by grade and species is recorded by the processors at the time of delivery. The boat identification number, the fisherman's name, and his limited entry permit number are also recorded at the time of sale. A standard form called a "fish ticket" is completed with the above information for each delivery (Fig. 9, App. 4.0) and is forwarded to the Alaska Department of Fish and Game. Summaries and analyses of catch are calculated from this basic fish ticket form. In addition, spot checks are conducted by the ADF&G to verify fish ticket information.

Data concerning species composition, relative native stock contributions, and discrete stock distribution by time and area are of poor quality, or in some cases, nonexistent. Data available from earlier studies may not be applicable to the present situation because of changing stock characteristics (declining natural runs and increasing hatchery production).

In general, the quality of catch data by gear, time, and area is good in the aggregate. Logbook summaries to determine areas of shaker* incidence are considered adequate but because of the dynamic nature of the troll fishery and chinook stocks involved, several more years of data will be required to differentiate all areas of shaker abundance in Southeastern Alaska. Data concerning age class structure of the troll catch and size frequency by age class are considered adequate. Spawning ground surveys and escapement counts are considered adequate to exemplify declining stock strengths. Tag recovery data on chinook of non-Alaskan origin is adequate to determine contribution of these stocks to the Alaskan troll fishery. Native chinook tagging began in 1977 and results have not yet been determined.

Catch by Canadians is reported by the Canadian government in the *Annual Summary of British Columbia Catch Statistics.* The catch data are reported in numbers of fish and pounds by species.

4.8 *Current Status of Stocks* (See Appendix 4.0 for additional information)

Native spring chinook salmon stocks are at a low level along the entire Pacific Coast.

Southeastern Alaska chinook stocks (all "spring" type) are also at a low level in most chinook systems monitored annually (Appendix, Table A, 1–4). While some cause for the decline of chinook in the Pacific Northwest can be attributed to loss or deterioration of spawning grounds and freshwater rearing areas such as mainstem and

*A "shaker" is a salmon of less than legal length that a fisherman releases (shakes off) from the hook.

tributary dams, industrialization and urbanization of rivers, and extensive watershed logging, none of these factors have significantly influenced the decline of Southeastern Alaska chinook. *All data indicate a major reason for population declines in Southeastern Alaska chinook is due to overharvest.* The chinook is the only species which is available to sport and commercial troll fisheries for three or four years, and in addition is often subjected to net fisheries near their river of origin.

Southeastern Alaska coho are below historic catch levels. Coho catches by all gear in Southeastern Alaska averaged 1.6 million fish per year during the thirty years from 1926–1955. This compares to about one million fish per year from 1960 to 1975 and about 800,000 fish per year from 1973 to 1975 (Alaska Salmon Fisheries Plan, 1976).

4.8 *Maximum Sustainable Yield (MSY)*

MSY is an average over a reasonable length of time of the catch which can be taken annually from a stock under current environmental conditions. MSY, as it applies to salmon management, is difficult, if not impossible, to evaluate in terms of any measurement of data other than past catches. The MSY for salmon is discussed in terms of total catch of salmon taken in the fisheries east and west of the longitude of Cape Suckling (for rationale see Section 8.3.1). While MSY is calculated as an average for each of the two areas, it is important that the complexity of the problems and importance or lack of importance of a single river system versus multiple river systems is understood.

Under ordinary management procedures using MSY, where recruitment requirements determine escapement goals for individual populations or groups of stocks, harvest levels should be based on surplus fish above recruitment requirements. Restrictions on terminal fisheries are therefore used to help achieve the proper balance between total catches and escapement.

The Alaska offshore troll fishery contributes to the total catch of salmon east of the longitude of Cape Suckling but is based on variable harvest levels of mixed stocks before the relative strength of individual runs are known. This fishery is based on salmon taken during an active growth period when natural mortality rates are low and when the high death rate of released undersized salmon increase the difficulty of justifying the fishery.

Achieving maximum poundage yields require eliminating harvests of salmon with remaining significant growth potential. The high-seas troll fishery creates a net effect of a major loss of salmon production in poundage yields as compared to the same fish taken closer to their natal streams.

The MSY figures (for five species of salmon, east of the longitude of Cape Suckling to Dixon Entrance and west of the longitude of Cape Suckling to 175° east longitude) are calculated from annual catches in all waters, State and Federal, off Alaska from 1953–1977.

The mean catch of chinook during an equal time period (25 years) prior to 1953 is statistically higher than the 25-year period used in the determination of MSY (see Table 4). The 1953–1977 period more accurately reflects current environmental conditions.

The MSY ranges are the average catches minus and plus one standard error.

4.8.2 *Acceptable Biological Catch (ABC)*

Acceptable Biological Catch (ABC) is a seasonally determined figure that may differ from MSY for biological reasons. The principles of salmon managment require ABC calculations to be made on the basis of the surplus assumed to prevail in any mix of river systems involved in the fishery.

In dealing with a mixed-stock fishery, in which diverse stocks mingle at different levels of abundance, and a fishery in which those diverse stocks consist of wild and hatchery fish from widely separated geographic areas, there are stocks which can be safely harvested but which cannot be separated from stocks within the fishery which should not be harvested.

If a fishery is allowed in a mixed-stock situation where certain stocks require protection, the inevitable consequence is that some from these stocks will be caught.

The offshore and coastal troll fishery in the FCZ (east of Cape Suckling) and Alaskan State waters is an example of such a situation. Wild Alaskan stocks of chinook are critically depressed and should not be harvested but are mixed with other stocks having a harvestable surplus.

The overall management of the five species of salmon off Alaska (east and west of Cape Suckling) requires an estimate of ABC be calculated from past annual catches (1971–1977) in all waters in and off Alaska. A range of ABC for each species is presented as a mean catch plus or minus one standard error (Table 5).

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TABLE 4

Average Annual Catch (MSY) From 1953-1977 Taken East and West of Cape Suckling

	Pounds (in thousands)	Numbers of salmon (in thousands)
Chinook		
West	5,133 - 5,548	247 - 267
East	5,130 - 5,476	296 - 316
Sockeye		
West	26,384 - 70,424	4,549 - 12,142
East	4,775 - 5,284	808 - 894
Coho		
West	4,780 - 5,415	602 - 682
East	8,362 - 9,723	959 - 1,115
Pink		
West	44,784 - 56,049	12,236 - 15,314
East	36,289 - 45,952	9,164 - 11,604
Chum		
West	27,320 - 31,016	3,682 - 4,180
East	17,218 - 20,799	1,822 - 2,201

TABLE 5

Mean Annual Catch (1971-1977) Expressed as an ABC Range
For Salmon East and West of Cape Suckling

	Pounds	Numbers (of fish in thousands)
Chinook		
West	5,063 - 6,390	225 - 284
East	4,424 - 4,950	286 - 320
Sockeye		
West	43,531 - 65,811	6,697 - 9,817
East	3,566 - 4,717	669 - 885
Coho		
West	3,636 - 4,600	505 - 631
East	7,420 - 9,053	841 - 1,100
Pink		
West	29,972 - 45,599	7,382 - 11,051
East	25,716 - 37,489	6,494 - 9,467
Chum		
West	30,288 - 35,687	4,071 - 4,796
East	12,232 - 17,813	1,292 - 1,883

The years 1971–1977 were used for this derivation of ABC because (1) the use of recent catch data (7 years as opposed to 25 years) is essential in understanding changes and trends which occur in biological systems over time and (2) a seven-year period takes into account a recent full cycle of spawning for major chinook and coho stocks. Additionally, 1971 was the initiation of the first reliable fish ticket information which clarified landings by area for the first time.

Cape Suckling is an established boundary for management and statistical areas and separates Southeastern Alaska waters from the remainder of Alaskan waters. There is no known information which shows a significant mixing of stocks originating west and east of Cape Suckling.

4.9 *Estimates of Future Stock Conditions*

The future status of salmon in the offshore Alaska troll fishery is unclear. Non-Alaska fall chinook in the fishery presently are strongly supported by West Coast hatchery production. The future condition of these stocks will be closely tied to existing hatchery programs and the success of new coast-wide rehabilitation and enhancement programs. *Hatcheries for spring chinook have generally been financially unsuccessful. Until this problem is solved, maintaining spring chinook stocks will depend largely on natural production.* Reversing the severely depressed status of Southeastern Alaska chinook can only be achieved by stern conservation efforts that eliminate or restrict further harvest of these fish. Efforts are underway in Southeastern Alaska to develop spring chinook brood stocks for artificial propagation programs. However, these efforts will remain small until successful techniques are established. *Until that time, conserving these stocks with an ABC approaching zero is vitally important.*

Prospects for enhancement of coho production in Southeastern Alaska, in addition to conventional hatchery programs, include several different approaches to artifically recruiting smolts to ocean nurseries. These include utilizing estuarine and freshwater culture in net pens, floating raceways, and unused natural rearing areas. There may be a significant number of unused freshwater nurseries for coho production in Southeastern Alaska that are not accessible to natural runs due to geologic features of the area. Active research on these approaches is underway at several locations. Caution should guide their use and development, especially in relation to simultaneously maintaining viable native stocks in adjacent areas (Heard, in press).

4.10 *Non-target Species Mortality Other Than Salmon*

This is not a serious problem with the ocean salmon fishery. Although species such as the Pacific halibut (*Hippoglossus stenolepsis*), rockfish (genus *Sebastes*), and lingcod (*Ophiodon elongatus*) may be caught, the total catch is minor.

5.0 Catch and Capacity Descriptors

5.1 *Data and Analytical Approaches (5.1.1., 5.1.2.)*

There is insufficient data to quantitatively define capacities. Harvesting characteristics (section 3.5.2) and catch trends (section 3.2.1.3) substantiate the values for DAC and DAH discussed below.

5.2 *Domestic Annual Capacity (DAC)*

Capacity of the power troll fishery to harvest salmon is exceedingly difficult to estimate. In 1976, approximately 100 vessels with a mean keel length of 41 feet made landings from offshore waters. Because of the increased efficiency of the vessels in the fishery, due to technological advances in electronic gear and increased hold capacity, it is estimated that the DAC is substantially greater than the largest catch that could be realized from the offshore fishery.

Provisions of limited entry will restrict the number of fishermen who could conceivably fish; this does not necessarily limit fishing effort.

Larger boats and increased experience on the part of the fishermen plus increasing sophisticated electronic gear is the means by which effort can increase without numbers of fishermen increasing.

5.3 *Expected Domestic Annual Harvest (DAH)*

Based upon past performance of the troll fleet and market trends, the DAH for chinook and coho is expected to be equivalent to OY.

5.4 *Domestic Annual Processing Capacity*

Domestic processors have in the past been able to process the entire domestic harvest of troll-caught salmon, and it is expected that they will be able to process the harvest of salmon allowed by this plan.

6.0 Optimum Yield (OY)

Optimum Yield (OY) may be obtained by a plus or minus deviation from ABC because of economic, social, or ecological objectives as established by law and the public participation processes. Ecological objectives where they relate primarily to biological purposes and factors are included in the determination of ABC. Where ecological objectives relate to resolving conflicts and accommodating competing uses and values, they are included as appropriate with economic and social objectives in the determination of OY.

The optimum yield for all species in all areas is based on the acceptable biological catch for the years 1971–1977 modified by social and economic considerations. The OYs are expressed as ranges determined from past mean catches plus and minus one standard error.

It is necessary to take into consideration MSY, ABC, and OY based on all species, all areas, for purposes of management. The plan, however, is subdivided and deals primarily with the one active fishery in the FCZ off Southeast (east of Suckling) as this is the area of council jurisdiction as addressed by the FCMA.

Catches of pink, chum, and sockeye salmon are relatively insignificant in the troll fishery. The 1971–1977 average annual combined catch of pink, chum, and sockeye is less than five percent of the total offshore troll salmon harvest (Table 13, Appendix 4.0) Pink, chum and sockeye salmon caught in the offshore are not considered significant in the overall optimum yield determination. Any catch likely to be realized in the troll fishery will be an acceptable by-catch.

Alternatives Considered

Two other concepts of optimum yield were considered in the development of this plan: (1) a greatly restricted OY essentially prohibiting trolling in the FCZ by certain time and area closures and (2) allowing OY and effort to expand according to current trends in the fishery (see also EIS, Section 12.5). The argument to greatly restrict and reduce the OY was considered unacceptable given the basic definitions of OY which mandates a consideration of relevant socio-economic factors. The preponderance of public testimony and socio-economic data did support this conclusion by showing the grave social and economic dislocation and hardships that would occur in several geographic areas and villages in Southeast Alaska. Likewise any expansion of effort or greatly increased catch or catch potential was not consistent with a principle management objective of controlling the expansion of the fishery. Neither was this alternative considered optimal in terms of the carefully considered balance of social and economic values and the biological principles of mixed stock management.

West of Cape Suckling: The optimum yield for waters west of Cape Suckling addressed by this plan is fully utilized by existing inshore net fisheries. (Table 6).

East of Cape Suckling: The optimum yield for salmon east of Cape Suckling is set equal to ABC (See Table 6).

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TABLE 6

OPTIMUM YIELD

For Salmon East and West of Cape Suckling

	Pounds	Numbers (of fish in thousands)
Chinook		
West	5,063 - 6,390	225 - 264
East	4,424 - 4,950	286 - 320
Sockeye		
West	43,531 - 65,811	6,697 - 9,817
East	3,566 - 4,717	669 - 885
Coho		
West	3,636 - 4,600	505 - 631
East	7,420 - 9,053	841 - 1,100
Pink		
West	29,972 - 45,599	7,382 - 11,051
East	25,716 - 37,489	6,494 - 9,467
Chum		
West	30,288 - 35,687	4,071 - 4,796
East	12,232 - 17,813	1,292 - 1,883

7.0 Total Allowable Level of Foreign Fishery (TALFF)

The amount of U.S. Pacific Coast salmon available to the Alaskan Troll fishery will vary from year to year. At the highest conceivable level of abundance, it can be completely harvested by U.S. domestic fisheries. Therefore, in compliance with PL 94–265 there is no allowable foreign catch except as proposed by a Reciprocal Fishing Agreement with Canada, or as a temporary Japanese salmon fishery might be allowed under terms of the Protocol Amending the International North Pacific Fisheries Convention signed April 25, 1978, which requires approval of all parties to the convention before such fishery can occur.

8.0 Management Regime

8.1 *Objectives*

(1) Control the expansion of the salmon troll fishery in the Fishery Conservation Zone.

(2) Allocate the salmon resource among user groups without disrupting present social and economic structures.

(3) Regulate the catch of salmon to assure adequate escapement for spawning.

(4) Reduce the catch of salmon with potential growth to increase the poundage yield from the troll fishery.

(5) Make cost effective the public investment in the high-seas salmon fishery.

(6) Promote the eventual development of a Pacific Coast salmon fishery management plan.

8.2 *Areas, Fisheries, and Stocks Involved*

This plan covers salmon off the coast of Alaska east of 175° East longitude.

Two management units are established: the waters west of Cape Suckling and the waters east of Cape Suckling to Dixon Entrance.

There are presently no offshore salmon fisheries west of Cape Suckling in the FCZ with the exception of those historical fisheries managed by the State (North Pacific Act). These are the False Pass (South Peninsula), Cook Inlet, and Copper River net fisheries. These fisheries are technically in the FCZ, but are conducted and managed by the State of Alaska as inside fisheries. Thus, no fishery is discussed for the FCZ west of Cape Suckling.

Within the FCZ, the only offshore salmon fishery east of Cape Suckling is the troll fishery. Historically, this fishery has been and presently is conducted without regard to the FCZ-State jurisdictional boundary line. If this line is interpreted as a management boundary line, it artificially divides the historical fishing pattern and management of the power troll fishery. This causes a situation which ignores the mobility of the fishery and the stock distribution of the resource, and fails to recognize practical problems of enforcement and monitoring.

Stocks involved in this fishery include all five species of Pacific salmon, however, chinook and coho are the target species. Chinook originate from rivers in Southeast Alaska, British Columbia, and Washington/Oregon/California. The latter two groups are the predominant stocks. Most coho originate from Southeastern Alaska with a minor contribution from British Columbia.

8.3 *Management Measures*

Proposed measures for the conduct of the salmon troll fishery include size, sex, area, seasons and gear regulations which are complementary with existing State of Alaska regulations.

The use of limited entry is proposed as a method of meeting the objective of curtailing expansion of this fishery.

In-season monitoring of the catch remains the primary technique available for management of the fishery. The Alaska Department of Fish & Game presently has an in-season catch monitoring and reporting system. This system should serve as the basis for in-season management of the offshore fishery. Refinement of this system of monitoring and reporting through the regulations suggested in this section should satisfy the critical data needs necessary for management of the troll fishery. As landings are made outside Alaska these data will be transmitted to the Council.

The Council intends that if any of the following management measures be disapproved, the balance of the plan should still be implemented.

8.3.1 *Domestic*

8.3.1.1 *Season, Gear, and Area Restrictions*

A. Seasons: 1. All waters east of the longitude of Cape Suckling are open to troll fishing for chinook, chum, sockeye, and pink salmon between April 15 and October 31.

All waters west of the longitude of Cape Suckling have no open season.

2. All waters east of the longitude of Cape Suckling are open to the troll fishery for coho between June 15 and September 20.

All waters west of the longitude of Cape Suckling have no open season.

3. All waters are open to sport fishing year-around.

Rationale. Alaskan inshore and coastal waters are open to chinook troll fishing by regulation from April 15 through October 31. This period corresponds with seasonally mild weather. Little fishing effort occurs beyond three miles during the coastal and inshore closure because of prohibitive weather. Effort in the offshore area increases from the April 15 opening of the coastal and inshore waters until it peaks in late July. After July, much of the effort shifts to the inshore and coastal areas.

The coho season inside 3 miles is presently June 15 through September 20. June 15 is approximately the date when coho appear in coastal and inshore waters in fishable numbers. The major catches usually occur after July 15, but by the September trolling date most trollers have quit fishing.

Regulatory seasons for the troll fishery are considered unrestrictive. The relatively long season allows distribution of catch during the entire migration of the many stocks and does not key fishing by time to specific stocks. It does, however, allow some chinook stocks to be fished during more than one year.

State waters west of the longitude of Cape Suckling have been closed to commercial troll fishing since 1973. Proposals have been made by commercial troll groups to re-open these waters to trolling, but the Alaska Board of Fisheries has ruled against such openings on the grounds that the troll fishing effort would be directed toward chinook salmon stocks that are already fully harvested in inshore fisheries. For these reasons, it is recommended that the waters west of Cape Suckling remain closed to troll fishing.

Cape Suckling was adopted as a boundary line for this plan because (1) of historical precedence, (2) of compatibility requirements with existing contiguous state management areas, and (3) certain concepts of stock separation.

Cape Suckling is a well known landmark that has traditionally been regarded as the northern and western boundary of the Southeast Alaska Region. It also provides a reasonable separation between areas in which the troll fleet has and has not consistently operated. Although exact areas of stock separation are not known (if indeed exact areas exist) it is known that the farther north one proceeds the higher the portion of northern salmon stocks, i.e. Prince William Sound, Cook Inlet and Bristol Bay, are encountered. Very few salmon tagged in Southeast Alaska

have been recovered west of Cape Suckling and vice versa.

The inability to predict stock run strength makes it impractical to adjust the opening dates of chinook season or to establish a mid-season closure prior to the beginning of the seasons.

The ideal conduct of the offshore fishery requires that uniform regulations for seasons and areas be adopted for the Fishery Conservation Zone and state waters.

Sport fishing regulations adopt State of Alaska (S.E. Region) regulations.

B. Gear: 1. Fishing with nets for salmon is not permitted in the area covered by this plan except as discussed under Section 8.2.

2. Commercial fishing is allowed only by trolling gear in the FCZ east of Cape Suckling.

3. Sport fishing is to be done only with a single line held in the hand or attached to a hand-held or closely attended rod. The line may not have more than one artificial lure or two flies or two single hooks attached.

Rationale. The ban on net fishing in offshore waters has been in effect since the mid-1950's by consent of the coastal fishery states and international agreement (see Sec. 3.2.1.1.).

The line limit and method for sport fishermen adopt the present State of Alaska regulations for Southeast Alaska.

8.3.1.2 Size and Sex Restrictions and Landing Requirements

A. Size: 1. Chinook salmon—28-inch minimum total length limit (with head on), 23 inches from the midpoint of cleithral (gill) arch to the tip of the tail (with head off).

2. All other species—None..

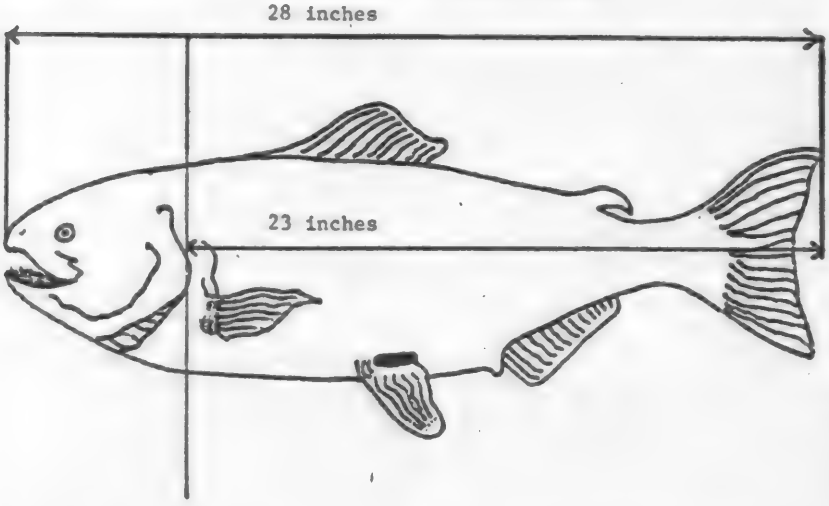
B. Sex: None.

C. Landing Requirements: Fin-clipped salmon must be landed with the head on.

D. Sport Bag Limit: Daily bag and possession limit of six (6) salmon, only three (3) of which may be chinook salmon.

Rationale. Chinook harvested by the troll fishery in Alaska do not attain maturity before two years of ocean residence. The average size of chinook with one and two years ocean residence is usually less than 28 inches (total length); most of these fish would be available to the troll fisheries and possible other fisheries in subsequent years if they were not harvested or if there were no mortality due to hooking and releasing.

The minimum size for chinook in Council waters is 28 inches total length, except that fish landed with the head off must measure at least 23 inches from the mid-point of the cleithral (gill) arch to the tip of the tail. (This regulation, while specific for the Fishery Conservation Zone (3–200 miles) is the same in State waters (0–3 miles).



Legal length—chinook salmon

No minimum size restriction is proposed for coho because coho harvested by the troll fishery in Alaska are available only during the second and last year of ocean residence. There is little preseason incidental catch of coho and weights for landings after that date average in excess of five pounds dressed.

Pink salmon caught in the Alaska troll fishery are also in their final year of life and are sufficiently large so that no size limit is necessary.

Chum and sockeye salmon are caught in insignificant quantities in the Alaska troll fishery. No size restrictions are recommended for these two species.

All troll-caught salmon landed fresh are dressed, head on. In recent years, freezing the catch at sea has become more common. The heads of all salmon are generally removed at sea before the fish is frozen. This process assures maximum quality and minimum handling by buyers.

A method of tagging salmon has been developed by implanting a micro-wire tag in the snout and clipping the adipose fin. At present there are several million salmon tagged in this manner at liberty in the Pacific Ocean. If landing tagged salmon with heads removed is allowed, valuable scientific information on migration patterns and hatchery contributions to the fishery will be lost. Tagged fish have the adipose fin removed; therefore, requiring those fish to be landed with head attached allows retrieval of the tag.

The sport fishery daily and possession bag limit matches that adopted for the S.E. Alaska coastal area by the Alaska Board of Fisheries.

8.3.1.3 *Limited Entry*

Council Findings as to Limited Entry

1. That limited entry or limited access into the Alaska power troll fishery in the FCZ is necessary to maintain present levels of effort and catch.

2. That the use of other management techniques in conjunction with a limited access system will help promote sound conservation and management practices and provide flexibility to deal with fluctuating biological and ecological factors, since other management techniques will operate more efficiently and with better results when used in conjunction with this limited access system;

3. That an ocean salmon management plan without a limited access system will in all probability result in increased effort by power troll fishermen who have so far fished exclusively in State waters, by fishermen excluded from fisheries by the limited entry program of the State of Alaska, and by fishermen from the State of Washington and elsewhere who are adversely affected by Federal Court decisions on resource allocation in their present fisheries.

4. That limited entry for the FCZ is necessary because alternative management measures, i.e., a ban on all trolling in the FCZ or a separate FCZ catch quota, are either too disruptive of present social and economic structure or too costly to administer and enforce.

General

Limited access into the power troll fishery in the Fishery Conservation Zone (FCZ) is important as one of the management tools needed to carry out the North Pacific Fishery Management Council's intention to stabilize at present levels the rate of interception of mixed stocks of salmon by stabilizing effort in that fishery.

The North Pacific Fishery Management Council recognizes that the implementation of limited entry as a management tool cannot by itself stabilize the rate of interception. It will help to achieve that goal most effectively in conjunction with other techniques, such as some form of quota, and/or restrictions on time, area, gear, size, etc. In this context, stabilizing the harvest may include the amount of harvest, the average size and weight of fish, species composition, and other considerations. This may mean that future phases of the limited access system being initiated could be tied to effort.

No greater qualification toward the initial issuance of a Federal entry permit will be gained by fishing after December 31, 1977.

Adopted Limited Entry Program

Any person who currently holds a valid State of Alaska Commercial Fisheries Entry Commission (CFEC) Power Troll Permit may fish in the FCZ off Alaska. This permit retains its original status relating to all of the restrictions and conditions placed on the permit and the bearer by the CFEC.

The Council has examined the methods and criteria utilized by the State of Alaska when it enacted the limited entry system that resulted in 950 power troll entry permits. Of particular significance to the Council is the fact that the State system was adopted after considering participation by fishermen throughout the troll fishery, including what is now the federally managed FCZ. The Council believes that Alaska's limited entry system and the data upon which it is based most accurately reflect the extent of present participation in and economic dependence on the entire troll fishery.

While it is not possible at this time to state conclusively that the optimum number of permits for the power troll fishery is 950, it is clearly not in excess of the number. Adopting the State scheme will thus establish an upward limit on the number of vessels which, while not an absolute limit on all additional effort, since upgrading is not prohibited, will help promote conservation.

In addition any power troll fisherman who (a) has fished in the FCZ off Alaska in any one of the base years 1975, 1976, or 1977 but (b) did not or does not have a State of Alaska CFEC Power Troll Permit and (c) does not fish or land fish in State waters, and (d) upon proof of said fishing during 1975, 1976, or 1977 (e) is entitled to a Federal Limited Entry Permit which is nontransferable and upon specific retirement for any reason that permit is retired from the fishery.

Data from 1977 indicate that a half dozen power trollers fished off Alaska in the FCZ. Insofar as these vessels fish only in the FCZ (as evidenced by Washington fish tickets and an absence of an Alaskan CFEC permit), their economic dependence can be said to be completely within the FCZ. Additionally, those power trollers have historically fished in the FCZ for the past several years.

This action is intended to maintain a fishing privilege gained by these power troll fishers, but is not designed or intended to create a new privilege (i.e., a State limited entry permit) or a transferable property right.

For exact regulations, restrictions, conditions and procedures see 50 CFR Part 674, Domestic Regulations. For a further discussion of the rationale and data base used to implement the CFEC and hence the Council's limited entry program (see Appendix 8.3.1.3).

8.3.1.4 *In-Season Adjustments*

In-season adjustment of time and area management of shellfish and finfish by fisheries by the State of Alaska in recent years compares favorably with the management of most other fisheries in the United States and elsewhere. The success of this management program may be attributed largely to the deliberate flexibility built into the governing system by State law and the resultant ability of the Board of Fisheries and the Department of Fish and Game to make timely changes in the regulations to meet changing conditions and needs. This flexibility, which has been realized through annual revision of the regulations by the Alaska Board of Fisheries, together with emergency orders and regulations issued inseason by the Board and the Department, has resulted in many benefits:

(a) New information and data relating to resource management (e.g. assessments of actual resource conditions) can be immediately incorporated into the management program, even when the fishery is in progress.

(b) Unanticipated resource conditions can be reacted to immediately to prevent overharvest or wasteful underutilization.

(c) Unexpected developments with respect to economic and social factors (natural disaster, changes in marketing conditions, cannery fires) can be accommodated so the resources are distributed and allocated in a manner which maximizes overall public benefits.

(d) Management philosophies and policies formulated through legislative and administrative processes may be carried out in the field by personnel familiar with local conditions.

(e) Management approaches which are proving unworkable or which are imposing undue hardships may be changed at once.

(f) Necessary inseason refinements in management programs can be accomplished primarily in the field with the advice and assistance of the users most directly affected.

8.3.1.5 *The Issuance of Field Orders*

A. The Council finds that the Optimum Yields in this plan, which are based upon historic performance of the fishery, economic, and other conditions in advance of the actual conduct of the fishery, may be found to be mis-specified in light of unpredicted and unanticipated adverse or favorable stock conditions which are revealed inseason. Under such circumstances, the Council further finds it appropriate for conservation and management purposes, that the Regional Director of the National Marine Fisheries Service, Alaska Region, or his designee, in close coordination with the Commissioner of the Alaska Department of Fish and Game, take immediate action by issuing field orders adjusting time and/or area restrictions; therefore, this plan provides that seasons and areas shall be subject to inseason adjustment by the Regional Director of the National Marine Fisheries Service. The Regional Director or his designee may adjust season opening and closing dates based upon the following considerations:

1. The effect of overall fishing effort within a major statistical area;

2. Catch per unit effort and rate of harvest;

3. Relative abundance of stocks within an area in comparison with preseason expectation;

4. The proportion of sublegal fish to legal fish being caught;

5. General information on the condition of stocks within the area;

6. Information pertaining to the optimum yield for stocks within the statistical area; or

7. Any other factors necessary for the conservation and management of the offshore salmon troll fishery.

B. In order to assume effective management of the salmon troll fishery resource as a unit through its range, inseason adjustments made by the Regional Director must be coordinated with similar actions taken by the State regarding waters under State jurisdiction. It is necessary that the Regional Director, to the extent possible, act in conjunction with the Alaska Department of Fish and Game in order to effect uniformity of management in State waters and the Fishery Conservation Zone. As a result, any changes proposed by the Regional Director will be accompanied by advance notice to allow for opportunity to maintain such uniformity. In most cases, the Regional Director will exercise his authority on the basis of recommendations received from the Department, and will rely on the Department for season data, reports, and assessments necessary to make a determination as to the advisability of any action contemplated. In all cases, continuous consultation between ADF&G and the Regional Director will be maintained.

It is expected that the actual opening and/or closing dates for the seasons prescribed in this plan will be adjusted by the Regional Director pursuant to the authority described in this section. Such action is not considered emergency action that would require amendment of the plan; adjusting the season opening and closing dates is meant to be an inherent part of the seasons themselves. For this reason, any adjustment made by the Regional Director or his designee will be effected by the issuance of a field order and announcement in the manner currently utilized by the State of Alaska.

Any inseason amendment of the plan's season or area or other implementing regulations beyond the scope of the above authority will be accomplished by emergency regulation, as provided by Section (305e) of the Act, in accordance with the recommendation of the Regional Director following consultation with the Commissioner of the Department of Fish and Game. It is understood that time will often be of the essence in making effective the aforementioned adjustment and changes.

8.3.1.6 *Troll Fishery Managed From Surfline to 200 Miles*

A management unit for the power troll fishery will encompass all the waters east of Cape Suckling between the coastline and the 200-mile limit. The Council is responsible for the FCZ (3–200 miles) and the State maintains responsibility for the coastal waters (0–3 miles). However, the management objectives and resulting management regime is similar in both waters since the fishery is considered continuous from 0–200 miles and handled by cooperative agreement.

8.3.2 *Foreign* (8.3.2.1–4)

As has been previously stated (Section 7.0) it is proposed that there be no foreign fishing allowed in Council waters except as provided by international bilateral agreements or reciprocal fishing agreement.

8.3.3 *Relationship of the Recommended Measures to Existing Applicable Laws and Policies*

It is the intent of this plan to promulgate regulations for waters under Council jurisdiction that will, to the extent possible, be compatible with existing Alaska State, Federal, and other Fishery Management Council regulations.

8.3.3.1 *Other Fishery Management Plans Prepared by a Council or the Secretary*

All preliminary fishery management plans and all Council fishery management plans address salmon as a prohibited species to all foreign fishing and to all domestic fisheries not specifically addressed by this plan. These plans include the following:

PMP—Snail Fishery of the Eastern Bering Sea
PMP—Trawl and Herring Gillnet Fishery of the Bering Sea and Aleutian Islands
PMP—Sablefish Fishery of the Eastern Bering Sea and Northeast Pacific
PMP—Shrimp of the Eastern Bering Sea and Gulf of Alaska
FMP—Commecial Tanner Crab Fishery off the Coast of Alaska
FMP—Gulf of Alaska Groundfish Fishery
FMP—Groundfish Fishery for the Bering Sea and Aleutian Islands Area.

An FMP adopted by the Pacific Fishery Management Council for salmon has some bearing on the North Pacific Council's FMP. The following compares the regulatory measures of the North Pacific Council Fishery Management Plan and the Pacific Council Fishery Management Plan.

Management Plan:

1. *Seasons*

NPFMC—April 15 through October 31 for chinook.
—June 15 through September 20 for coho.
PFMC—May 1 through June 14 for all species *except* coho north of the Oregon/California border.
—April 15 through May 14 for all species *except* coho south of the Oregon/California border.
—July 1 through September 15 for all species north of Point Grenville.
—July 1 through October 31 for all species from Point Grenville to Cape Falcon.
—June 15 through October 31 for all species from Cape Falcon to the Oregon/California border.
—May 14 through September 30 for all species south of the Oregon/California border.

2. *Gear*

NPFMC—power troll and sport gear.
PFMC—power troll gear, hand troll gear, and sport gear allowed (varies with management areas).
—single and barbless hooks except bait hooks and salmon plugs may be barbed only during all early seasons denoted by prohibition against landing coho.

3. *Area Restrictions*

NPFMC—all waters west of the longitude of Cape Suckling closed to commercial troll fishing.
PFMC—waters north of Cape Falcon closed to commercial troll fishing June 15–30.

4. *Size*

NPFMC—28-inch minimum length for chinook; all fin-clipped salmon to be landed head-on; no length restriction for other species.
PFMC—28-inch minimum length for chinook north of Cape Falcon; 26-inch minimum length for chinook south of Cape Falcon; 16½-inch minimum length for coho north of Oregon/California border; 22-inch minimum length for chinook south of Oregon/California border; no length restriction for other species.

8.3.3.2 *Federal Laws and Policies*

In Council waters there are no existing troll fishery policies promulgated by the United States Federal Government (see Section 3.2.1.1).

8.3.3.3 *State Laws and Policies* (8.3.3.4)

The proposed regulations recognize that all State laws pertaining to vessels registered under the laws of the State, including State landing laws, will continue to apply to fisheries addressed in these regulations.

8.4 *Enforcement Requirements*

Enforcement of fishery regulations in Council waters will be the responsibility

of the U.S. Coast Guard and the National Marine Fisheries Service. Enforcement of regulations in State waters, including landing laws for salmon caught in Council waters, will be the responsibility of the Alaska Department of Public Safety in accordance with P.L. 94–265 and Alaska Statute Title 16, 5 AAC, of the Fish and Game code.

8.5 *Reporting Requirements*

Reporting requirements by domestic fishermen and processors are identical to existing State requirements as set forth in Alaska Statutes Title 16.

Fishermen intending to land fish outside the State of Alaska must forward to the Regional Director, National Marine Fisheries Service, the following: name and permit number, vessel name, total number of salmon by species, catch area statistical number, number of lines used, and port of landing. The report must be made within 72 hours of the sale by way of a completed fish ticket or other document of the State where landed.

Since little recreational fishery exists in the waters under Council jurisdiction, no reporting requirements are presently provided for under this plan.

Reporting catches by statistical area will be done in accordance with the redefined statistical area designations as issued by the Alaska Board of Fisheries. (See following)

8.5.1 Data Standards

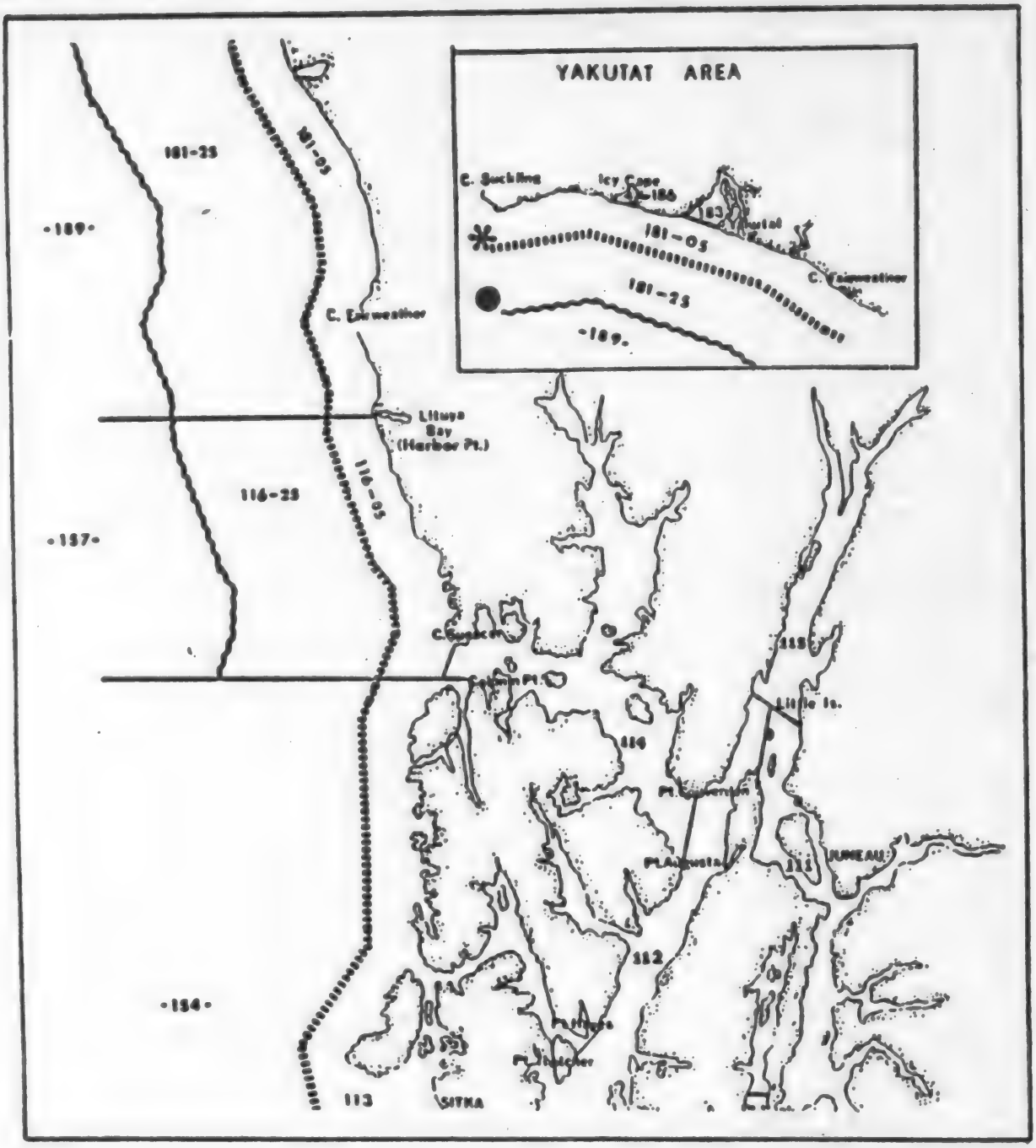
All data will be reported in accordance with the U.S. system (i.e., in pounds and inches).

8.5.2 *Time and Place of Reporting*

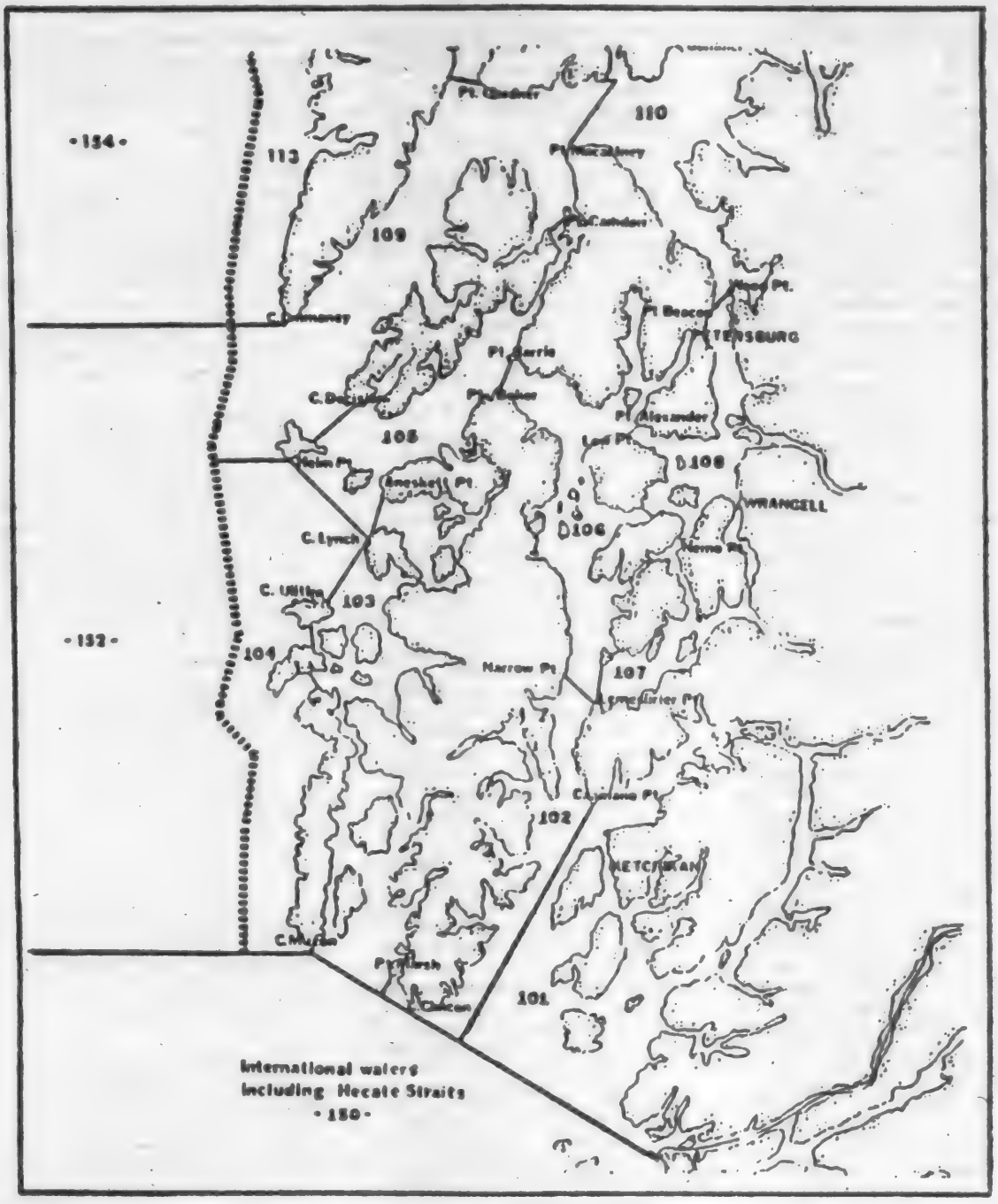
Landings from the Alaska offshore troll fishery in numbers of fish, pounds, and species will be recorded by the processors at the time of delivery. The boat identification number, fisherman's name, limited entry permit number and additional information as required will also be recorded at the time of sale. A standard form (fish ticket) will be completed with each delivery and forwarded to the Alaska Department of Fish and Game (Section 4.8). Alaska Department of Fish and Game requires that an "intent to operate" form be filed prior to any commercial buying or processing operation for fishery resources. Further, an annual report is also required from all commercial operators. This includes the type of operation (buyer/processor, shorebased/floater, fish-frozen/cured/canned), the peak month employment, the pounds and price by species paid to fishermen, and the pounds and value by product form of all processing.

BILLING CODE 3510-22-M

SOUTHEASTERN ALASKA STATISTICAL AREAS (Northern part)



SOUTHEASTERN ALASKA STATISTICAL AREAS (Southern part)



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Statistical Areas in Southeastern Alaska for Reporting Troll Catches on Fish Tickets

101—All contiguous waters of Alaska east and north of a line from Caamano Point to a point on the International Boundary at 131°45′ W. longitude.

102—All waters south of a line from Narrow Point to Lemesurier Point, west of Area 101 to a line from Point Marsh light to 132°17′30″ W. longitude on the International Boundary.

103—All waters north of a line from Point Marsh light to 132°17′30″ W. longitude on the International Boundary to Cape Muzon, and east of a line beginning at Eagle Point on Dall Island and passing successively through Point Arboleda, Point San Roque, Cape Ulitka, Cape Lynch to the southwest entrance point of Halibut Harbor on Kosciusko Island, and south of the latitude of Aneskett Point.

104—All waters (within Alaska's three mile limit) north of the latitude of Cape Muzon, 54°39′50″ N., west of Area 103, south of the latitude of Helm Point, 55°49′30″ N., and south of a line from Helm Point on Coronation Island to Cape Lynch.

105—Waters of Sumner Strait, north and east of a line from Cape Decision to Helm Point to Cape Lynch to the southwest entrance point of Halibut Harbor, and north of the latitude of Aneskett Point, west of a line from Point Baker to Point Barrie, and south of a line from Point Camden to Salt Point light in Keku Strait.

106—All waters of Clarence Strait north of a line from Narrow Point to Lemesurier Point to Ernest Point to the most southerly point on Etolin Island, Stikine Strait south of the latitude of Round Point, Sumner Strait west of a line from Point Alexander to Low Point, and east of a line from Point Baker to Point Barrie, Wrangell Narrows, south and west of a line from Prolewy Point to the northern tip of Mitkof Island, and all waters of Duncan Canal.

107—All contiguous waters of Ernest Sound and Bradfield Canal east of a line from Lemesurier Point to Ernest Point to the most southerly point of Etolin Island, Zimovia Strait south of the latitude of Nemo Point, and Eastern Passage and Blake Channel south of a line from Babbler Point to Hour Point.

108—Waters of Frederick Sound south of a line from Wood Point to Beacon Point (excluding Wrangell Narrows), Stikine Strait, Sumner Strait, Zimovia Strait and Eastern Passage inside a line from Point Alexander to Low Point to Round Point to Nemo Point to Hour Point to Babbler Point.

109—All waters of Frederick Sound and Chatham Strait south of the latitude of Point Gardner, south of the latitude of Elliott Island and west of a line from Elliott Island to Point Macartney, north and west of a line from Point Camden to Salt Point light, north of a line from Cape Decision to Helm Point, and all waters (within Alaska's three mile limit) north of the latitude of Helm Point, 55°49′30″ N., and south of the latitude of Cape Ommaney, 56°10′00″ N.

110—Frederick Sound, Stevens Passage and contiguous waters north of a line from Beacon Point to Wood Point, east of a line from Point Macartney to Elliott Island, north of the latitude of Elliott, Seymour Canal south of 57°37′ N. latitude and south of a line from Point League to Point Hugh.

111—Stephens Passage and contiguous waters north of a line from Point League to Point Hugh and Seymour Canal north to 57°37′ N. latitude, south of the latitude of Little Island Light and east of a line from Little Island Light to Point Retreat Light.

112—All waters of Lynn Canal and Chatham Strait south of the latitude of Little Island Light to the latitude of Point Gardner, west of a line from Little Island Light to Point Retreat Light, east of a line from Point Couverden to Point Augusta, and east of a line from Point Hayes to Point Thatcher.

113—All waters (within Alaska's three-mile limit) between the latitude of Cape Ommaney, 56°07′15″ N., and the latitude of Column Point, 56°07′15″ N., and west of a line from Point Hayes to Point Thatcher.

114—All waters of Icy Strait west of a line from Point Couverden to Point Augusta, east of the longitude of Cape Spencer, 136°39′30″ W., and north of the latitude of Column Point, 56°07′15″ N.

115—All waters of Lynn Canal north of the latitude of Little Island Light.

116—All waters (inside twelve miles) north of the latitude of Column Point, 56°07′15″ N., west of the longitude of Cape Spencer, 136°39′30″ W., and south of the latitude of Harbor Point, 56°36′45″ N., at the southern entrance of Lituya Bay [Includes the P.D. GROUNDS]

116–05—All waters of Area 116 inside Alaska's three-mile limit.

116–25—All waters of Area 116 offshore between three and twelve miles.

152—All waters (outside Alaska's three-mile limit) north of the latitude of Cape Muzon, 54°39′50″ N., and south of the latitude of Cape Ommaney, 56°10′00″ N.

154—All waters (outside Alaska's three-mile limit) north of the latitude of Cape Ommaney, 56°07′00″ N., and south of the latitude of Column Point, 56°07′15″ N.

157—All waters (outside twelve miles offshore) north of the latitude of Column Point, 56°07′15″ N., and south of the latitude of Harbor Point, 56°36′45″ N. [The FAIRWEATHER GROUNDS; West Bank, East Bank, and Ham Bone]

181—All waters (inside twelve miles) north of the latitude of Harbor Point, 56°36′45″ N., at the southern entrance of Lituya Bay and east of the longitude of Cape Suckling, 143°53′00″ W.

118–05—All waters of Area 181 inside Alaska's three-mile limit.

118–25—All waters of Area 181 offshore between three and twelve miles.

189—All waters (outside twelve miles offshore) north of the latitude of Harbor Point, 58°36′45″ N., and east of the longitude of Cape Suckling, 143°53′00″ W.

8.6 *Research requirements*

The data base upon which this Fishery Management Plan is formulated requires refinement and expansion; the following areas are identified as needing further research:

1. Origin(s) and sizes of stocks (coho and chinook),

2. Migration and timing of runs (coho and chinook),

3. Foreign and domestic interception rates (chinook and coho),

4. Fleet participation and catch-per-unit-effort (coho and chinook),

5. Interaction between user groups; gear conflicts (coho and chinook),

6. Escapement requirements (coho and chinook), and

7. Economic data base.

In regards to items 1 and 2 there is an urgent need to establish the magnitude of the chinook stock contributions of the Situk, Alsek, Stikine, Taku, Chickamin, and Unuk Rivers to the troll fishery in both Council and Alaska State waters. There is presently no stock size or catch rate information for the management of these stocks and the protection of their escapement requirements.

8.7 *Permit Requirements*

Domestic requirements are covered in Section 8.3.1.4. Possible foreign fishery activities would involve Canada only through a bilateral agreement; no individual fishery permits would therefore be required.

8.8 *Financing Requirements* (8.8.1, 8.8.2)

The economic value of salmon resources and the complexities of their management make salmon research and management priority budget items for the Alaska Department of Fish and Game. Additional management requirements will necessitate additional funding.

Presently the only new direct cost will be for the continued operation of the salmon management planning team. This team will be responsible for continuing evaluation and revision of the plan as circumstances dictate.

Enforcement of regulations under this Plan will be a cooperative effort among the State, National Marine Fisheries Service, and Coast Guard. It is expected these additional enforcement duties will require some increase in enforcement staffs. The National Marine Fisheries Service and the U.S. Coast Guard anticipate increases in their appropriations and staff to

accommodate the new extended jurisdiction law (200-mile limit).

Revenues are expected to approximate the previous year (see Section 3.7, Appendix 3.0).

9.0 Statement of Council Intentions To Review This Plan After Approval by the Secretary

The North Pacific Fishery Management Council will, after approval and implementation of this plan by the Secretary, maintain a continuing review of the fisheries managed under this plan by the following methods.

1. Promote the development of a Fishery Management Plan for all salmon off Alaska to deal with the management regimes and resource in the State's waters and the FCZ.

2. Maintain close liaison with the management agencies involved, usually the Alaska Department of Fish and Game and the National Marine Fisheries Service, to monitor the development of the fisheries and the activity in the fisheries.

3. Promote research to increase its knowledge of the fishery and the resource, either through Council funding or by recommending research projects to other agencies.

4. Conduct public hearings at appropriate times and in appropriate locations, usually at the close of a fishing season and in those areas where a fishery is concentrated, to hear testimony on the effectiveness of the management plans and requests for changes.

5. Consideration of all information gained from the above activities and development, if necessary, of amendments to the management plan. The Council will also hold public hearings on proposed amendments prior to forwarding them to the Secretary for possible adoption.

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11.0 Appendices

11.1 *Appendix I—Supportive Data*

Note.—Appendix I, consisting of Tables AI–1 through AI–5 and Figures AI–1 and AI–2 is referenced but not included here. This material consists of catch statistics detailing gear, week, number of boats, landings, and catch (both in number of fish and pounds, by species and area). Appendix I material is on file with the North Pacific Fishery Management Council and may be obtained from either the council or from the Alaska Department of Fish & Game, Commercial Fisheries Division.

11.2 *Appendix II*

Regulatory-Definitions

1. *Act* means the Fishery Conservation and Management Act of 1976, Public Law 94–265 (16 U.S.C. 1801–1882).

2. *Authorized Officer* means: a. Any commissioned, warrant, or petty officer of the Coast Guard;

b. Any enforcement agent of the National Marine Fisheries Service;

c. Any officer designated by the head of any Federal or State agency which has entered into an agreement with the Secretary of Commerce or the Commandant of the Coast Guard to enforce the provisions of the Act;

d. Any Coast Guard personnel accompanying and acting under the direction of any person described in subparagraph (a) of this paragraph.

3. *Commercial fishing* means fishing for the purpose of sale or barter.

4. *Fishing* means: a. The catching, taking, or harvesting of fish;

b. The attempted catching, taking, or harvesting of fish; or

c. Any other activity which can reasonably be excepted to result in the catching, taking or harvesting of fish.

5. *Fishing vessel* means any boat, ship, or other craft.

6. *Landing* means bringing fish to shore or off-loading fish from a fishing vessel.

7. *Salmon* means any anadromous species of the family *Salmonidae*, genus *Oncorhynchus*, commonly known as salmon, including but not limited to: Chinook (or King) salmon—*Oncorhynchus tshawytscha;* Coho (or Silver) salmon—*O. kisutch*; Pink (or Humpback) salmon—*O. gorbuscha;* Sockeye (or Red) salmon—*O. nerka;* and Chum (or Dog) salmon—*O. keta.*

8. *Salmon length* means the shortest distance between the tip of the snout or jaw (whichever extends farther) and the

tip of the longest lobe of the tail, measured while the salmon is lying on its side, without resort to any force (including squeezing the tail) or mutilation of the salmon.

9. *Power Troll Gear* means equipment used for commercial fishing which consists of one or more lines used to drag lures behind a moving vessel, which lines originate from a powered spool or receptacle fastened to the vessel, and the extension or retraction of which is directly to the spool or receptable without disengaging any gurdy or outboard arm from its fixed position on the vessel.

11.3 *Appendix III*

Management Areas: The North Pacific Council Management Area includes the entire Fishery Conservation Zone in the Arctic Ocean, Bering Sea, and North Pacific Ocean within the following boundaries:

a. All waters east of the northern U.S.–U.S.S.R. Convention Line of 1867, thence southeast to 175° east longitude, thence east to the longitude of Cape Suckling;

b. All waters east of the longitude of Cape Suckling to the U.S.-Canada International Boundary at Dixon Entrance.

General Restrictions: a. No person shall use nets to fish for solmon other than in those areas permitted under the provisions of this plan.

b. No person shall take any species of salmon:

1. Which is less than the minimum size (measured in terms of the salmon's length as defined in Section 8.3.1.2) specified in these regulations;

2. During closed seasons or in closed areas specified in these regulations;

3. By means of gear or methods prohibited by these regulations.

c. No person shall possess, have custody, control, ship, transport, offer for sale, sell, purchase, import, or export any species of salmon or part which was taken in violation of the Act, these regulations, or any other regulation issued under the Act.

d. No person shall possess, while in the North Pacific Council Management Area, any salmon taken in the North Pacific Council Management Area for which a size limit is set forth in these regulations, in such condition that its size cannot be determined.

e. No person shall fish for salmon while on a vessel which has aboard:

1. Any salmon which is less than the minimum length for that species in the Management Area where the fishing is taking place; or

2. Any species of salmon for which the season is closed in the Management Area where the fishing is taking place; or

3. Any salmon in such condition that its size cannot be determined.

f. No person, while on board a fishing vessel, shall mutilate or otherwise disfigure a salmon in a manner which extends its length to conform to any minimum size requirements specified in these regulations.

g. No person shall land any salmon taken in violation of the Act, these regulations, or any other regulations issued under the Act.

h. No person shall:

1. Refuse to permit an Authorized Officer to board a fishing vessel subject to such person's control for purposes of conducting any search or inspection in connection with the enforcement of this Act, these regulations, or any other regulation issued under the Act;

2. Forcibly assault, resist, oppose, impede, intimidate or interfere with any Authorized Officer in the conduct of any search or inspection described in subparagraph (1) of this paragraph;

3. Resist a lawful arrest for any act prohibited by these regulations; or

4. Interfere with, delay, or prevent, by any means, the apprehension or arrest of another person knowing that such other person has committed any act prohibited by these regulations.

Penalties. Any person or vessel found to be in violation of these regulations will be subject to the civil and criminal penalty provisions and forfeiture provisions prescribed in the Act.

Emergency regulations. The Secretary may issue emergency regulations, if and when needed, under 305(e) of the Act, announced by publication of a notice in the **Federal Register.**

Open seasons and areas. All open seasons shall begin at 0001 hours and terminate at 2400 hours on the dates specified herein. Unless otherwise specified, Pacific Daylight Time will apply.

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2. Stocks of all species of salmon throughout Alaska were being fully utilized by fishermen in existing in-shore fisheries. This contention has been supported in International North Pacific Fisheries Commission publications: Bulletin 10, (1962); Fredin, et al. (1973). These documents successfully supported the United States case for maintaining the abstention principle relative to salmon fisheries by the Japanese on the high seas. This principle in effect stated that Japanese fishing for North American salmon stocks east of 175 west longitude would be prohibited if the United States could show that the stocks were being fully utilized by the domestic fisheries and were the subject of an on-going research and management program.

3. Statewide salmon populations including coho and chinook salmon stocks in many areas have declined since the early years of the fishery. This decline coupled with an increase in the total fishing effort being expended to harvest salmon stocks has insured that any surpluses in excess of broodstock requirements are not surplus to the needs of the existing fisheries. This is particularly true in the case of chinook and coho salmon where recreational fisheries have become a significant portion of the total harvest allocation within the last ten years. The Cook Inlet area has one of the largest stocks of chinook salmon north of Cape Spencer and south of the Bering Sea. The commercial harvest of this species has declined from a high of 187,000 fish in 1951 to a harvest in the 17 to 30,000 range in late 1950's and early 1960's. The commercial fishery on the major part of these stocks was closed in 1964. A total closure on commercial and recreational fishing for the major stocks was instituted in 1972. This closure is still in effect. Coho salmon in both Cook Inlet and Prince William Sound have experienced declines in the past 15 to 20 years and are the subject of intensive net fisheries.

4. The major concentration of chinook and coho salmon north of Cape Spencer is in Western Alaska. The Bristol Bay fishery is prosecuted by a large fleet of drift and set gillnetters in conjunction with the harvest of the predominant sockeye salmon. Harvest in the Yukon and Kuskokwim is carried out by the large fleet of primarily local residents fishing within the mouths of these major rivers. During the past 15 years to 20 years there has been a significant increase in the levels of effort for all salmon net fisheries in Alaska. These levels have recently been stabilized by the adoption of the State law that limits new entry into these heavily developed fisheries. Nevertheless, this new program has not resulted in any surplus fish availability beyond the legitimate and established needs of the existing fisheries.

5. Sound conservation practices demand that insofar as possible harvests be taken from specific stocks in relationship to their ability to sustain different levels of harvest on an annual basis. The State management program has attempted to accomplish this by fishing generally in the vicinity of the mouths of major spawning rivers or at least close to aggregrates of these rivers. The additional pressure of any offshore troll fishery catching mixed stocks of undetermined origin; harvesting immature fish that have not obtained maximum growth and confounding any attempts by the State to manage stocks based on escapement requirements, particularly when these stocks are already being used to their allowable maximum by carefully regulated inshore fisheries, would be contrary to rational management practices.

3.3.2.1 *Measures Employed To Regulate the Fishery*

Examination of regulations adopted over the last 60 years indicates that troll fleet harvests have been affected to a minor degree only. The first major regulation to control commercial fishing effort in saltwater occurred by an Act of Congress on June 26, 1906. This legislation provided for a 36-hour per week closure in all waters of Alaska. Rich and Ball (1933) state that, "they (the troll fleet) fished for years without the slightest regard for the fishery laws and regulations, assuming that line fishing was not subject to provisions of the law of 1906. In 1923 certain trollers were convicted for fishing during the weekly closed season, and since then this type of fishing has conformed in general to the usual regulations."

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FIGURE 1

MINOR PRODUCERS		MAJOR PRODUCERS		MEDIUM PRODUCERS	
500 or less		10,000 or more		500 - 10,000	
33	Martin	16	Stikine	32	Keta
30	Big Goat	11	Taku	27	Chickamin
29	Rudyard	7	Alsek	25	Unuk
28	Walker			19	Harding
26	Klahine			10	Chilkat
24	Grant			3	Situk
23	Herman			20	Bradfield
22	Anan			31	Wilson-Blosson
21	Eagle				
18	Tom				
17	Aaron				
15	Muddy				
14	Farragut				
13	Chuck				
12	King Salmon				
9	Dohn				
8	East				
6	Akwe				
5	Italio				
4	Dangerous				
2	Lost				
1	Ankau				

Chinook Salmon River Systems in Southeastern Alaska.

Appendix 3.0—Description of Fishery

3.1 *Areas and Stocks Involved*

The ocean salmon troll fishery is a mobile fishery which presently extends from the U.S.-Canada International Boundary (Dixon Entrance) to Cape Suckling in the Gulf of Alaska. Many of the vessels also participate in other fisheries, such as the longline fishery for halibut and bottomfish, the albacore tuna fishery and the crab fishery. Some vessels also participate in other types of salmon fisheries, i.e., purse seining and gillnetting.

The mobility of ocean troll fishing fleets, mixtures of stocks, presence of several age-maturity classes, and the migratory nature of the various stocks involved make the management of the ocean salmon fishery extremely complex. These characteristics result in both the fishing fleet and the resource crossing interstate and international boundaries. The management of the salmon resource is further complicated by multiple gear utilization of many of the stocks.

Tagging conducted in the outside waters of Southeastern Alaska from west of Cape Fairweather to Dixon Entrance by the Alaska Department of Fisheries between 1950 and 1952 indicates that the outside troll fleet is highly dependent on chinook stocks that originate to the south. Of fish tagged in outside waters, 80 percent of the tag recoveries were made in non-Alaskan waters and over 53 percent of the river recoveries were made in the Columbia River, mostly from the fall run. It seems reasonable to assume that during the 1930s, when peak catches were made in Southeastern Alaska, the Columbia River stocks contributed to a greater degree than when the tagging program was conducted (see section 4.5).

Parker and Kirkness (1956) point out that direct application of results in "calculating the contributions of these rivers to the Southeastern Alaska troll catch should be made with discretion." They point out that factors such as varying recovery effort and application of tagging results to years other than those in which the experiments were conducted could cause errors in interpretation. Not having the necessary information to correct the errors the authors drew the conclusions that the Columbia and Fraser rivers were the two most important contributors to the *offshore chinook troll fishery* and other streams from southern Oregon to Southeastern Alaska contributed to a lesser degree.

The importance of the Columbia River to the offshore troll fishery had been established previously by the U.S. Bureau of Fisheries in a 1927 tagging operation on the west coast of Baranof Island. A total of 382 chinook were tagged and of the 38 recaptures, 22 were taken entering the Columbia River (Rich and Ball, 1933).

It appears that the decline of the chinook salmon stocks of the Columbia River have contributed greatly to the reduced troll harvest in Southeastern Alaska (Parker and Kirkness 1956; Ken Henry, NMFS, personal communication).

The contribution of chinook from western and central Alaska to the ocean salmon fishery appears to be insignificant to the present ocean salmon fishery.

Tagging studies indicate that coho and pink salmon harvested by the ocean troll fishery are primarily of Alaskan origin, although Washington State and Canadian coho do contribute to a small degree.

Recent tag recoveries of hatchery produced chinook have indicated a significant contribution to the Alaska troll fishery from Washington, Oregon and California.

3.2.1.2 *General Description of Fishing Effort*

The Alaska Board of Fish and Game in 1973 adopted regulations to prohibit trolling in State waters of Alaska west of Cape Suckling. The decision to close those waters was based on several factors:

1. Troll harvest in those waters had been relatively insignificant compared to other fisheries. For some years, no troll harvest was recorded. There was, however, an indicated interest to expand troll fisheries even to the Kodiak and Western Alaska areas.

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FIGURE 2

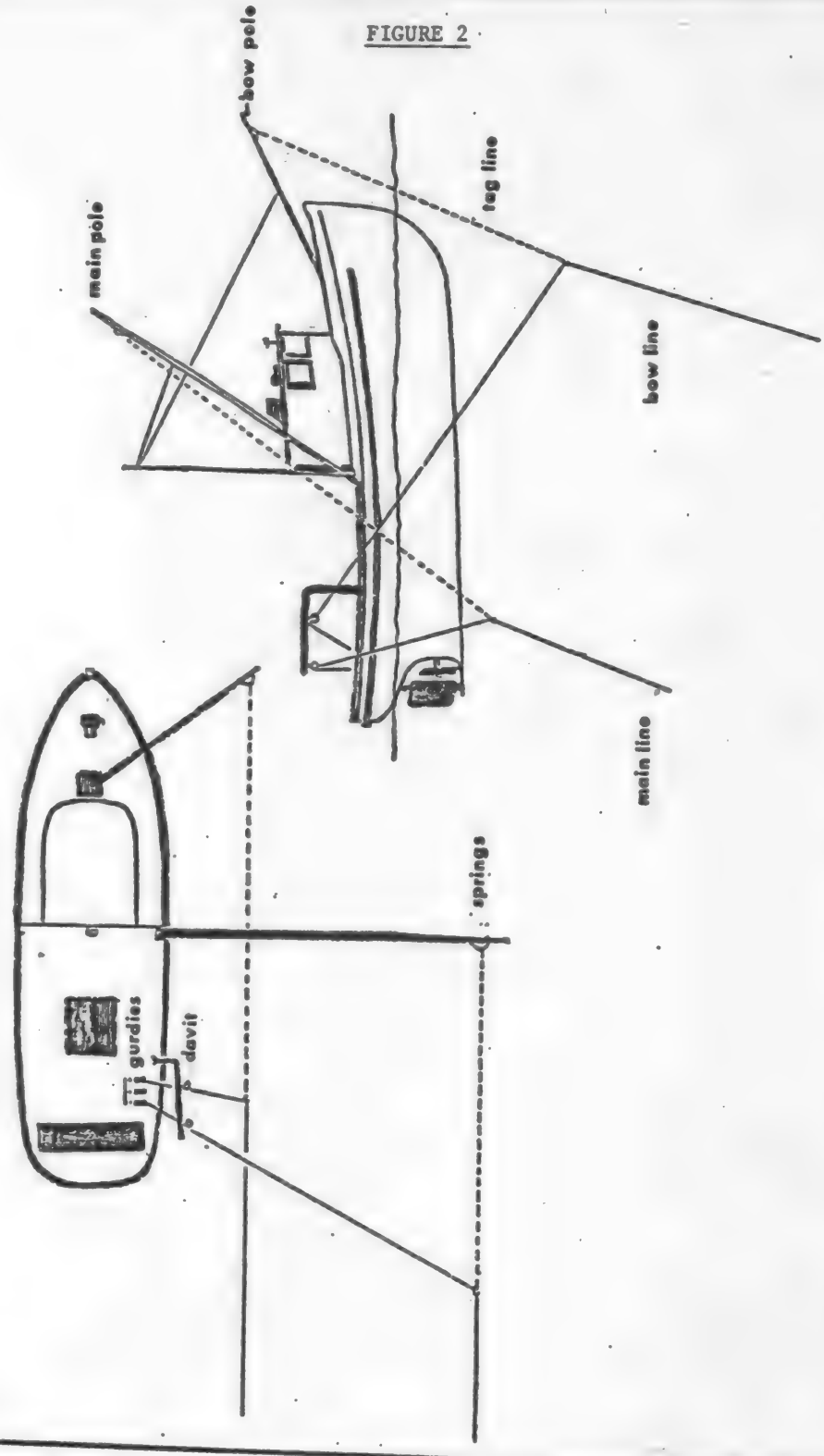

Figure 2 Basic Rigging of a Typical Commercial Troller.

The White Act, passed in 1924, stated that "there shall be allowed an escapement of not less than 50 per centum of the total number thereof. In such waters the taking of more than 50 per centum of the run of such fish is hereby prohibited." This law had no effect on the taking of chinook or coho as the size of the total run was impossible to predict or enumerate. In 1957 a coastwide regulation was adopted that closed the coastal and offshore troll fishery in Alaska from November 1 to April 14, imposed a limit of four lines and a 28-inch (fork length) minimum size for chinook. Net fishing in international waters was also prohibited by this time (see section 3.2.1.1). The winter closure was probably not effective in curtailing catches because inclement weather allows little effort during this time period. The effects of the 28-inch minimum are difficult to assess as fish buyers often refused to buy small chinook.

The troll season was restricted in inside waters in areas with concentrations of immature and maturing chinook are protected. The 28-inch fork length minimum size also applied to inside trolling.

Regulation of the amount of fishing effort in Alaska's commercial salmon fisheries was recognized as a necessity in the early 1900's. Many attempts failed due to the unconstitutionality of trying to restrict nonresident fishermen. The 1973 legislature created the Commercial Fisheries Entry Commission and began a new era in fisheries management. In 1974, that Commission began stabilizing effort levels in the already overcrowded salmon fisheries. All commercial fisheries are now monitored and limitations are being imposed for each fishery as optimal effort levels are reached.

In the power troll fishery, entry permits were originally issued to individual fishermen on the basis of the amount of participation in the fishery and the economic dependence on it. Once issued the permits are property of the permit holder and are freely transferable to anyone. The law withstood a constitutionality test up to the State Supreme Court level in *Isakson v. Rickey*. 550 P. 2d 359 (Alaska 1976). An initiative petition attempt to repeal the program was defeated in the 1976 general election. Alaska's limited entry program was the first such program of its kind in the U.S.

3.4 *History of Research* (3.4.1, 3.4.2)

Because of the coastwide movement of vessels and the salmon species they pursue, most research has been coastwide. The first ocean salmon research results that had significant coastal management implications were published in 1920. This work on salmon in Washington coastal waters revealed the rapid growth of coho in their final summer of life and the advantages of delaying their capture (Smith 1920).

Although tagging salmon at sea to study migration patterns was attempted in the early 1920's, it was not until the late 1930's and early 1940's that significant information regarding ocean salmon movements was available.

In 1950 the Alaska Department of Fisheries began research on stock origin, as well as biological descriptors of chinook and coho. However, it was not until 1970 that research was begun dealing specifically with the troll fisheries. The research included: life history studies of chinook and coho salmon; a logbook survey of troll fishery effort and catch rates; a sampling program to recover marked chinook and coho; collection of age data and information on numbers of undersized fish; and vessel distribution surveys.

Compilation of catch statistics in the troll fishery began in the early 1900's. However, accurate reporting of weekly landings by area and gear type did not begin until 1968. Further refinements in data processing since 1970 have produced timely catch statistics detailing gear, week, numbers of boats and landings, and catch, both in numbers of fish and pounds, by species and area (Appendix Table AI–2 and AI–3). These data reflect troll catches by area for inshore, coastal, and offshore waters.

There is a long history of cooperative research between the U.S. and Canada on salmon problems, as well as an exchange of statistical data. Catches landed in foreign countries are reported to the Department of Fish and Game in various agencies' technical reports, usually on an annual basis (i.e., annual Summary of British columbia Catch Statistics 1976).

In the early 1960's an informal committee on chinook and coho salmon and a technical working group were established between the two countries' research staffs providing an accessible route for exchange of data. Canadian research in the Fishery Conservation Zone off Alaska has been in the form of cooperative studies of a coastwide nature (e.g. the coastwide mark-recovery program).

3.5 *Socio-Economic Characteristics*

3.5.1 *Output of Subject Domestic Commercial Fishery*

In 1977, the statewide catches (all gear) of chinook, coho, and pink were 626,723, 1,815,167 and 28,582,428 fish, respectively. Catch trends for these species by troll and all gear types are addressed in Section 3.2.1.3.

In Southeastern Alaska, the salmon catches (all gear) for chinook, coho and pink salmon in 1977 were 290,886, 944,611 and 13,838,497 fish, respectively, of which 93.4, 53.7, and 2.0 percent, respectively, were caught by troll gear. Table 1 reveals these relationships. Figures 3 and 4 show a 10-year trend for Southeastern troll vs Alaska (all gear) chinook and coho catches.

3.5.1.1 *Value of Catch (Ex-vessel)*

Total ex-vessel value of the commercial troll salmon landings in Southeastern Alaska in 1975 and 1976 was $4,594,000 and $9,956,000, respectively, of which 13 and 15 percent, respectively, were taken by hand trollers. Totals by species and type of gear for 1975 and 1976 are shown in Table 2.

The average prices per pound paid to fishermen for salmon in 1976 are shown in Table 3. The highest *average* price of $1.60 per pound was for troll-caught king salmon in Sitka. This table shows that troll-caught salmon bring higher prices than salmon caught by other means.

3.5.1.2 *Description and Value of Product (Wholesale)*

The latest year is 1976 for which complete salmon production and wholesale value data are available. Table 4 shows production and value statistics for king, coho, and pink salmon by product form in Southeastern Alaska and all Alaskan waters.

Separate production statistics are not kept for troll caught salmon. However, since 94 percent of all southeastern king salmon are troll caught (Table 5), most of the production and value of king salmon in Southeastern Alaska can be attributed to trolling. In 1976, 2,653,000 pounds of king salmon were processed at a value of $5,945,000. Almost 100 percent of this production was in the fresh/frozen form.

Of all the coho caught in Southeastern Alaska, 54 percent were caught by troll gear. Assuming the wholesale production value of troll-caught coho was comparable to coho caught by other gear (95 percent of all the southeastern coho production was fresh/frozen form), the wholesale value of Southeastern Alaska troll-caught coho was $7,667,000.

The contribution of troll-caught pink salmon was only $399,000 in 1976.

3.5.1.3 *Markets, Domestic & Export*

Since the most recent domestic market data are from the Analysis of the Distribution System for Northwest-Originated Fresh and Frozen Salmon (Schary et. al., 1969), any conclusions as to the distribution by destination of products must be highly tentative.

Estimates from the above analysis are from a total Northwest catch of 66 million pounds of chinook and coho salmon in 1968. Approximately 37.4 million pounds were available for distribution in fresh and frozen product form with 9.1 million pounds coming from Alaska (see Fig. 5). To this was added 4.9 million pounds of imported salmon from British Columbia. Of this total, West Coast consumption was approximately 15.1 million pounds and that of the Midwest and East Coast was 12 million pounds. Export and East Coast markets were significant receiving areas for salmon products.

Although the two largest markets for exports in 1968 were France and the United Kingdom with 4.9 million pounds and 4 million pounds, respectively, the major export markets for the U.S. fresh and frozen salmon in 1977 were Japan, France, Canada, Sweden, and the United Kingdom with 31.9, 12.9, 5.5, 3.9, and 3.6 million pounds, respectively. The overall exports of the U.S. fresh and frozen salmon in 1977 were 65.6 million pounds valued a $117.5 million, up 71 percent in quantity and 70 percent in value from the previous year. These increased exports in 1977, when compared to those in 1968, reflected declines in the 1977 catch of salmon by other salmon importing countries.

In 1976, 22 million pounds (3 major species) were available for distribution in fresh/frozen, cured, and canned forms from Southeastern Alaska with a wholesale value of $34 million. These comprised 31 percent in quantity and 33 percent in wholesale value of Alaska total. The composition of wholesale value for these species in Southeastern Alaska by product form shows that 56 percent was in fresh/frozen, 44 percent in canned, and only 0.01 percent in cured forms in 1976. Adequate information dealing with domestic market channels are not available.

3.5.2 *Domestic Commercial Harvesting Characteristics*

In 1976, 2,683 licenses were issued for the troll fishery by the Department of Revenue. However, 4,281 entry permits were issued of which 956 were power troll and 3,325 were hand troll. The number of vessels for which actual landings were made was 2,076 of which 801 were power troll and 1,275 were hand troll. The mean keel length of power and hand troll vessels was 35 and 22 feet, respectively. The net mean tonnage of power and hand troll vessels was 11 and 2 tons, respectively. Similar data for 1977 are not available. Figures 6 and 7 show the distribution of vessels by weight and length.

3.5.2.1. *Total Gross Income of Fleet (Subject Fishery and all Other Fisheries)*

Total gross income is equivalent to the total ex-vessel value from all fisheries (troll salmon, net salmon, crab, halibut, etc.) in which the troll fleet participated. In 1976, $13.9 million was the total gross income from all fisheries for power trollers of which 60 percent ($8.4 million) was from power troll-caught salmon.

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TABLE 1

SALMON CATCHES IN SOUTHEASTERN ALASKA BY SPECIES, 1977

Species	All Gear		Troll Gear			
	No.	Lbs	No.	(%)	Lbs.	(%)
Chinook	290,886	4,198,644	271,759	(93.4)	3,979,496	(94.8)
Coho	944,611	8,246,658	506,835	(53.7)	4,158,400	(50.4)
Pink	13,838,497	67,864,799	281,188	(2.0)	1,194,728	(1.8)
Red	1,085,148	7,555,206	5,704	(0.5)	37,473	(0.5)
Chum	738,720	7,509,394	11,680	(1.6)	97,931	(1.3)
Total	16,897,862	95,374,701	1,077,166	(6.4)	9,468,028	(9.9)

FIGURE 3

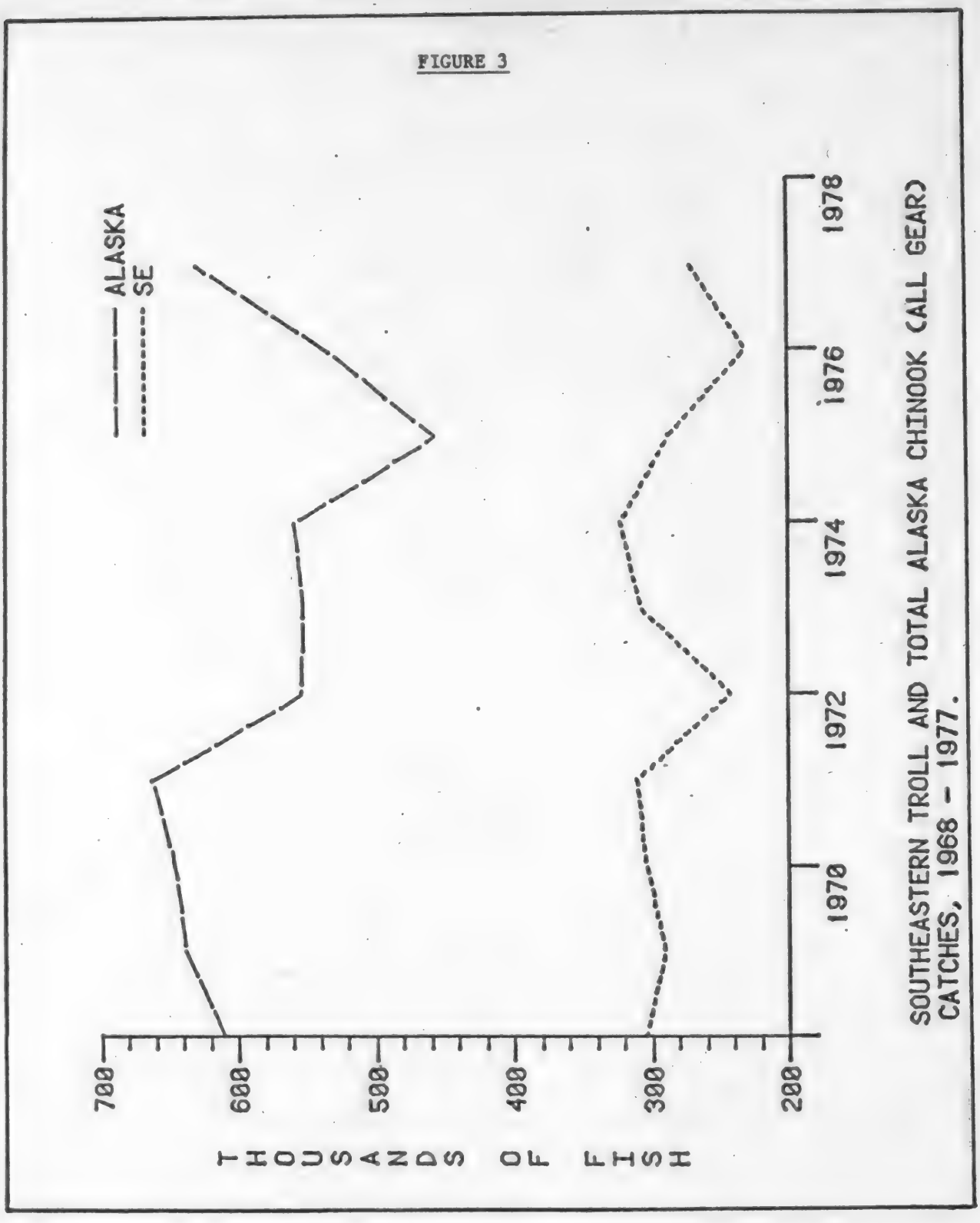

ALASKA
SE
700
600
500
400
300
200
THOUSANDS OF FISH
1970
1972
1974
1976
1978
SOUTHEASTERN TROLL AND TOTAL ALASKA CHINOOK CALL GEAR) CATCHES, 1968 - 1977.

FIGURE 4

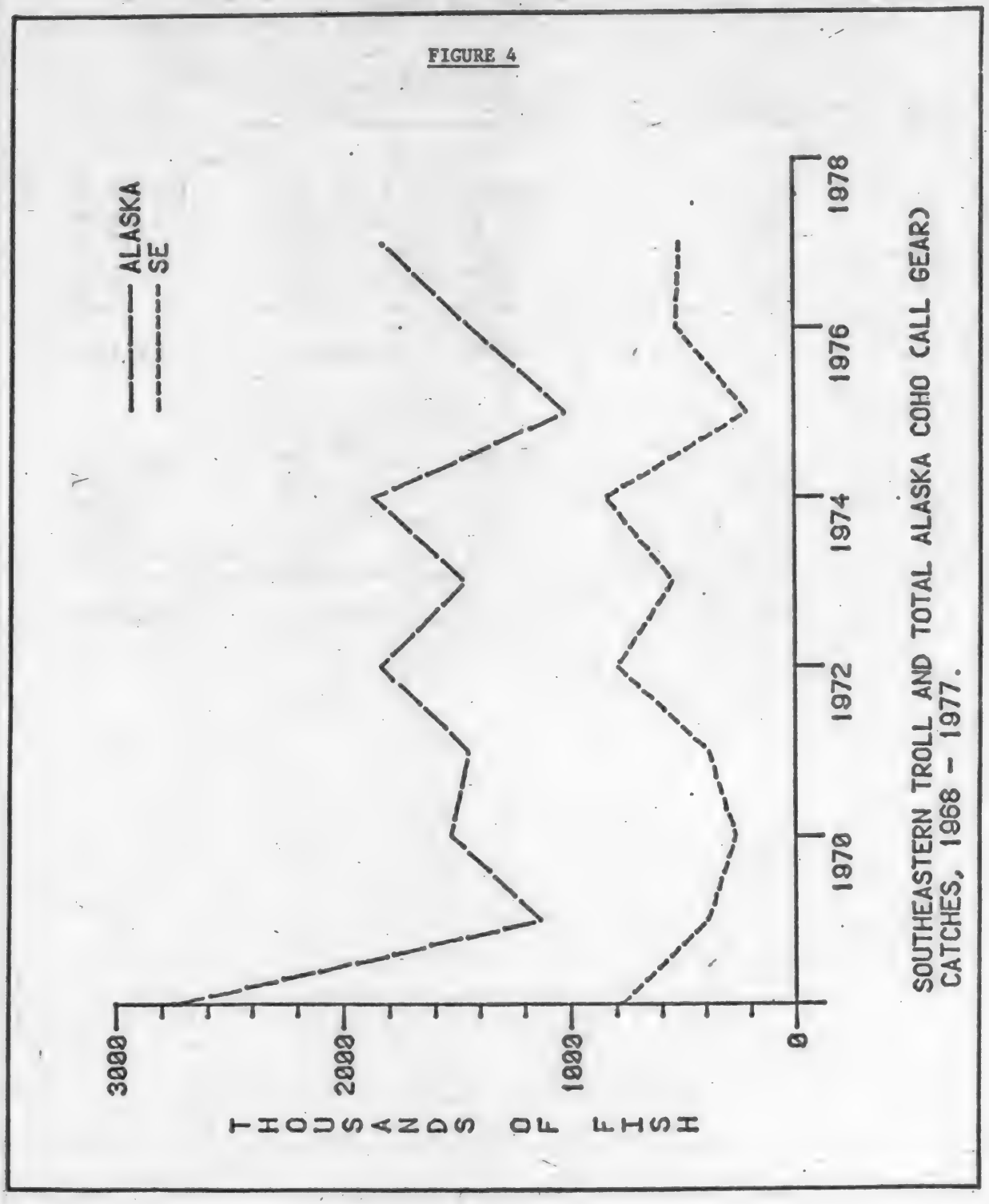

ALASKA
SE
3000
2000
1000
0
THOUSANDS OF FISH
1970
1972
1974
1976
1978
SOUTHEASTERN TROLL AND TOTAL ALASKA COHO CALL GEAR) CATCHES, 1968 - 1977.

Table 2. Value of Troll Salmon Catch by Species and Type of Gear in Southeastern Alaska, 1975 and 1976.

Year	Species	Type of Gear		
		Hand	Power	Total
1975	Coho	$188,231	$ 813,861	$1,002,092
	King	346,747	3,111,290	3,458,037
	Pink	43,703	73,369	117,072
	Chum	2,268	9,372	11,640
	Red	355	4,898	5,253
	TOTAL	$581,304	$4,012,790	$4,594,094
1976	Coho	$ 890,388	$4,244,507	$5,134,895
	King	516,387	3,856,264	4,372,651
	Pink	91,451	325,150	416,601
	Chum	13,025	12,119	25,144
	Red	2,262	4,318	6,580
	TOTAL	$1,513,513	$8,442,358	$9,955,871

Table 3 . Average Price Paid Per Pound to Fishermen in 1976.

AREA	Species	Gear	Price	AREA	Species	Gear	Price
KETCHIKAN	Kings:	Seine	$ .50	SITKA	Kings:	Seine	$ .00
		Gill Net	.95			Gill Net	1.47
		Troll	1.44			Troll	1.60
	Reds:	Seine	.63		Reds:	Seine:	.00
		Gill Net	.78			Gill Net:	.95
		Troll	.86			Troll	.75
	Coho:	Seine:	.56		Coho	Seine	.00
		Gill Net	1.05			Gill Net	1.21
		Troll	1.25			Troll	1.36
	Pinks:	Seine:	.32		Pinks:	Seine:	.43
		Gill Net:	.41			Gill Net:	.51
		Troll:	.57			Troll:	.56
	Chums:	Seine	.51		Chums:	Seine	.00
		Gill Net	.63			Gill Net	.76
		Troll	.63			Troll	.61
Petersburg/ Wrangell	Kings:	Seine	1.09	Juneau/ Yakutat	Kings	Seine	.42
		Gill Net	1.26			Gill Net	.85
		Troll	1.52			Troll	1.56
	Reds:	Seine	.74		Reds:	Seine	.61
		Gill Net	.79			Gill Net	.86
		Troll	.90			Troll	.72
	Coho:	Seine	.89		Coho:	Seine	.62
		Gill Net	.99			Gill Net	.90
		Troll	1.42			Troll	1.32
	Pinks:	Seine	.38		Pinks:	Seine	.32
		Gill Net	.42			Gill Net	.35
		Troll	.54			Troll	.56
	Chums:	Seine	.59		Chums:	Seine	.56
		Gill Net	.66			Gill Net	.67
		Troll	.71			Troll	.72

Source: Alaska Department of Fish and Game Catch and Production Leaflet 1976.

Prices Include an Estimate of Bonuses Paid to Fishermen.

1975 PRODUCTION AND WHOLESALE VALUE OF KING, COHO, AND PINK SALMON IN THE SOUTHEASTERN REGION AND ALL ALASKAN WATERS (ALL GEAR TYPES)

Region & Species	CURED Production 10^3 lbs*	CURED Value 10^3 $*	CANNED Production 10^3 lbs	CANNED Value 10^3 $	FRESH/FROZEN Production 10^3 lbs	FRESH/FROZEN Value 10^3 $	TOTAL Production 10^3 lbs	TOTAL Value 10^3 $
Southeast								
King**	0.4	0.5	14.	22.	2,733.	4,225.	2,747.	4,247.
Coho	---	---	179.	281.	2,238.	2,760.	2,417.	3,041.
Pink	---	---	8,935.	12,350.	1,495.	1,185.	10,430.	13,535.
TOTALS	0.4	0.5	9,128.	12,653.	6,466	8,170.	15,594.	20,823.
All Alaskan Waters								
King	130.0	106.0	384.	696.	4,541.	6,663.	5,055.	7,465.
Coho	22.0	35.0	2,355.	3,294.	5,332.	5,628.	7,709.	8,957.
Pink	0.4	1.5	26,524.	36,176.	2,407.	2,116.	28,931.	38,294.
TOTALS	152.4	142.6	29,263.	40,166.	12,280.	14,407	41,695.	54,716.

SOURCE: Alaska Department of Fish and Game Catch and Production Leaflet, 1975, Juneau, Alaska.

* 10^3 means that the values are in thousands of pounds or dollars,

** King is the same as a chinook salmon.

TABLE 4

Percentages by Species For Alaskan Salmon Troll Catches

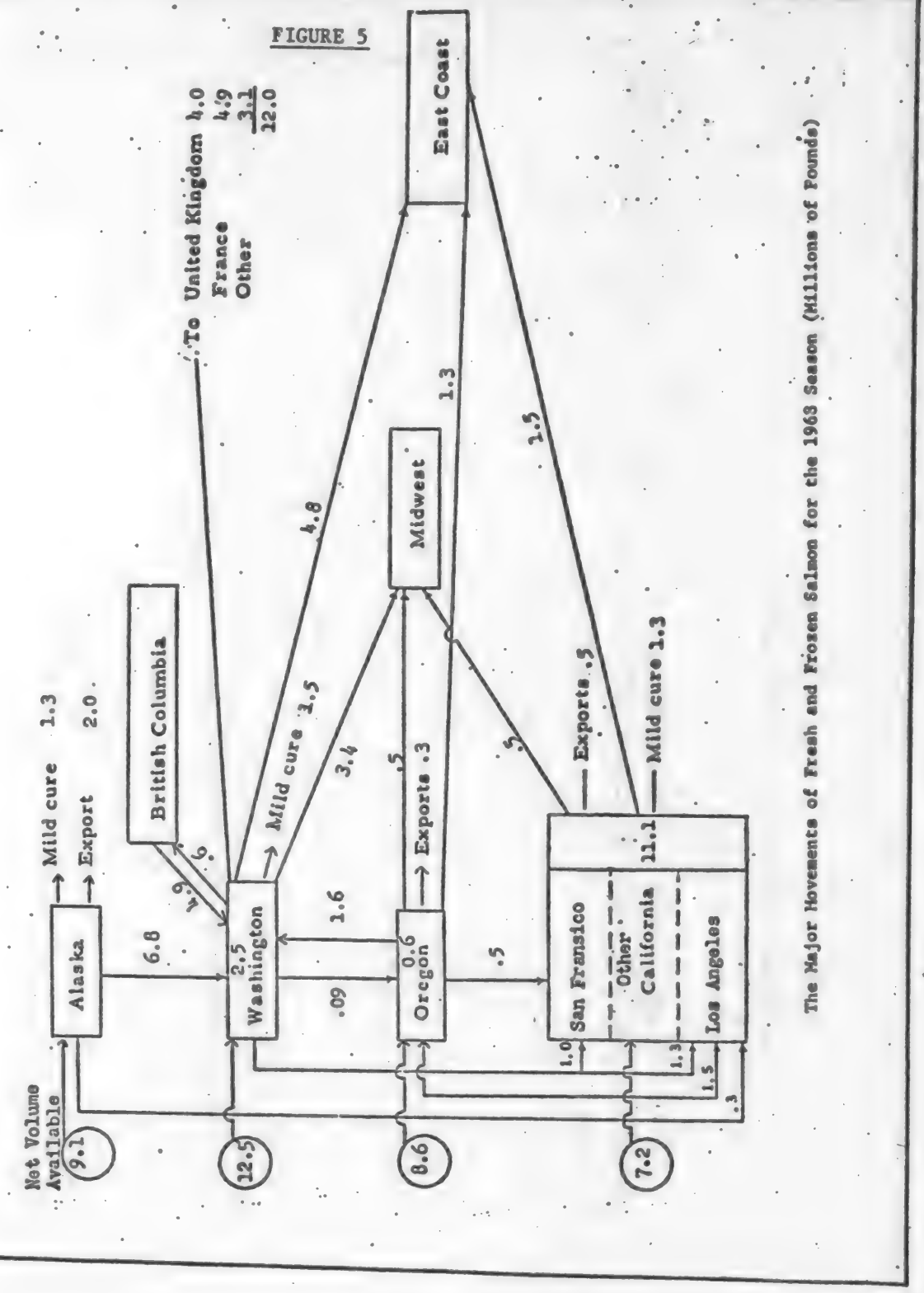
Species	Percent of Total S.E. Catch (all gear)	Percent of S.E. Troll Catch	Percent of Species Catch in S.E. Caught by Troll Gear	Percent of Species Catch in All Alaskan Waters Caught By Troll Gear
Chinook	13	71	95	55
Coho	10	24	42	18
Pink	51	5	2	*
Chum	21	*	*	*
Sockeye	5	*	*	*

TABLE 5

* Less than one percent

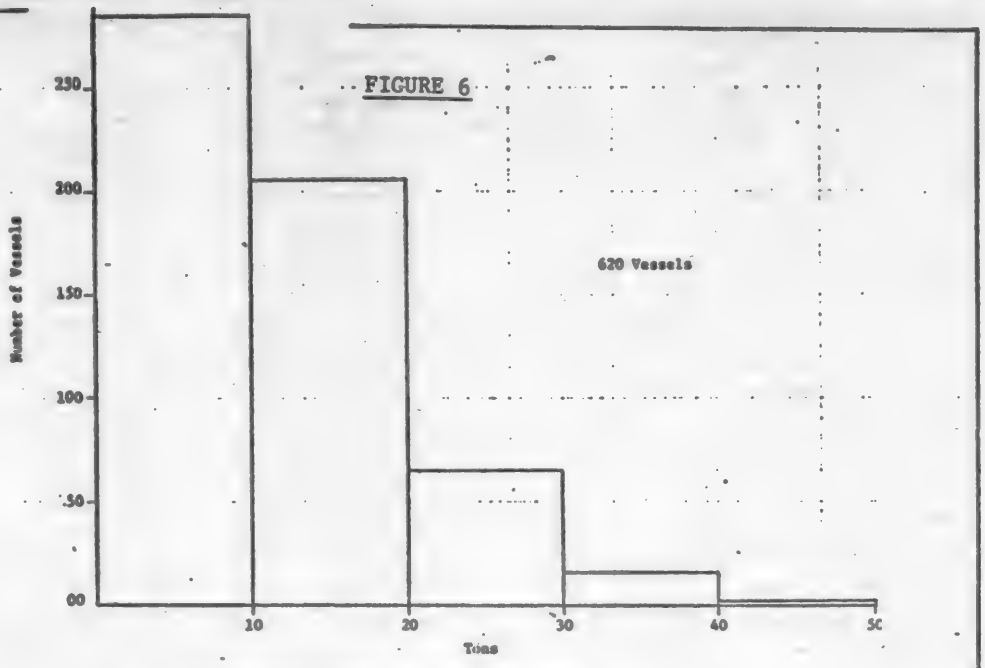
Source: ADF&G Catch and Production Leaflet, 1975. Juneau, Alaska.

FIGURE 5



The Major Movements of Fresh and Frozen Salmon for the 1968 Season (Millions of Pounds)

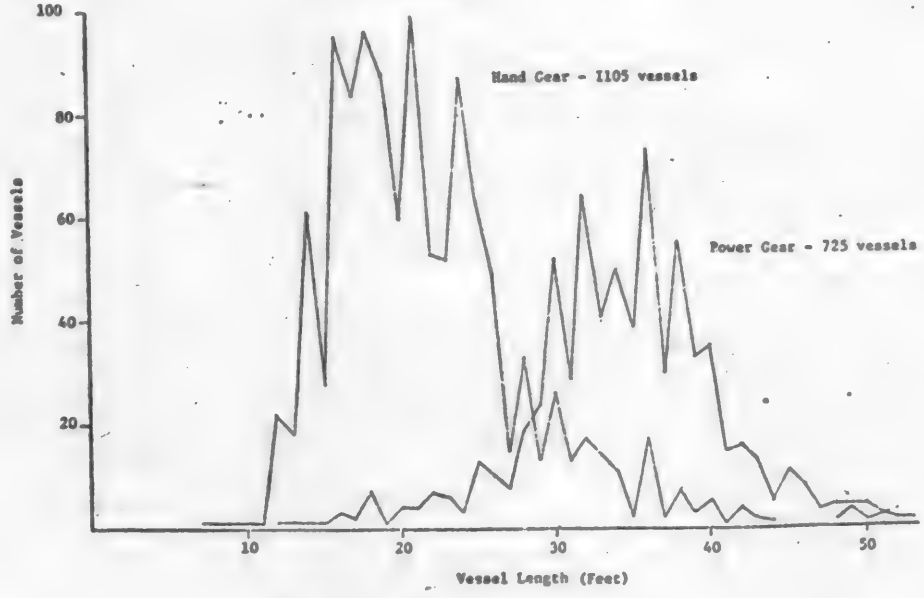
FIGURE 6



Net Tonnage of Vessels, Power Trol. Gear, 1976

Source: Commercial Fisheries Entry Commission

FIGURE 7



Keel Length of Vessels, 1976

Source: Commercial Fisheries Entry Commission

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In the same year, $5.3 million was the total gross income from all fisheries (halibut, crab, etc.) for hand trollers of which 28 percent ($1.5 million) was from hand troll-caught salmon. The remaining 72 percent is attributed predominantly to halibut and net-caught salmon. These figures suggest hand trolling serves as a secondary fishery, on the average. However, this masks the true picture that many hand trollers are small operators who only hand troll.

3.5.2.2 *Investment in Vessels and Gear*

The investment in vessel and gear indicates the size and importance of the fishing segment. There are 2 ways in estimating investment; one estimate is the average purchase price paid by the present owners, and the other estimate is the average cost to replace the vessels, gear, and equipment. Some vessels were purchased as used and others were purchased as new.

No Study has been done for estimation of investments in vessels and gear (total and average per fleet/gear unit) for the troll vessels. However, in 1977, a survey was made by Alaska Trollers' Association, Ketchikan, by sending questionnaires to all power troll permit holders (approximately 900). They received 130 responses and found out that an average estimated market value for power troll vessel and gear was $74,500.

3.5.2.3 *Annual Participation in Subject Fishery*

Landing ticket summaries show that 872 power troll and 1,938 hand troll vessels made 14,320 and 21,635 landings, respectively, during 1977 (see Table 6 for number of vessels and landings by species).

3.5.2.4 *Total Manpower Employed and Labor Payments*

Statistics for employment in the troll salmon harvesting sector are not available. There is currently no State of Alaska or Federal agency collecting employment data on an annual basis which is discrete enough to break out employment by fishery. The Alaska Department of Labor does publish employment statistics quarterly by major industrial classification. However, the source of this information is employer's contribution reports for unemployment insurance, and therefore does not reflect total employment since significant segments such as self-employed persons, their spouses and children under 21 are excluded.

3.5.2.5 *Economic Viability*

To specify the economic condition of this fishery as an average net return over the whole fleet, or by appropriate subcategories of vessels within the fleet, several kinds of data are required. In addition to the gross income from this fishery and all other fisheries in which these vessels participate (most are multiproduct firms), cost of production information is required as well as the development of an analysis of the production function. Further, in order to determine how efficient the firms are, estimates of least cost production and maximum potential net returns must be derived and compared with current earnings. This requires estimating maximum sustainable economic yield (MSEY). To estimate MSEY requires a biological yield function, product demand curves, production function analysis, and input costs. Most of this information is not available.

3.5.3 *Domestic Commercial Processing Characteristics*

In 1976, 38 plants (36 companies) and 2,050 employees processed over 50 million pounds of seafood in Southeastern Alaska. In terms of salmon, 20 plants handled fresh/frozen production and 9 plants dealt with canned production.

3.5.3.1 *Total Gross Income In Area Processors*

Fig. 8 shows gross income since 1969 for Southeastern Alaska processors at the first wholesale level. Salmon production dominates the seafood industry in this area. Since 1969, 20–50 percent of the salmon production has been in the fresh/frozen form and is indicative of the troll industry.

3.5.3.2 *Investment in Plant and Equipment*

Investment figures for plant and equipment are necessary for cost analysis and can be used as a management tool for short and long-run decisions. Presently no capital investment data are available on this subject.

3.5.3.3 *Total Employment and Labor Income*

No statistics on total annual employment and labor income relating to processing of troll salmon are available.

3.5.3.4 *Economic Viability*

There is no single source of information on economic viability of processing troll salmon. Data required to address this question are similar to that needed for the harvesting sector.

3.5.4 *Recreational Fishing Characteristics*

Recreational (sport) fishing for salmon in Southeastern Alaska is presently conducted entirely within inshore and coastal waters and, as such, is managed by the State of Alaska.

3.5.5 *Subsistence Fishing Characteristics*

All salmon species taken for subsistence in Southeastern Alaska are captured entirely within inshore and coastal waters and are taken in insignificant quantities when compared to the commercial harvest.

3.5.6 *Indian Treaty Fishing Characteristics*

Under the terms of the Alaska Native Land Claims Settlement Act of 1971 Alaska Natives waived all aboriginal and/or treaty rights pertaining to the harvest of salmon in Alaskan waters. There are no Alaskan Indian treaties pertaining to the harvest of salmon in Alaskan waters.

On the Annette Islands Reserve, near Ketchikan, however, President Woodrow Wilson on April 28, 1916, established for the Metlakatla Indians, an exclusive fishing zone of 3,000 feet, extending outward from the shoreline (at mean low tide) and completely surrounding the reserve. Catches by inhabitants of the reserve include all five species of Pacific salmon taken by trap, troll, seine and gillnet gear. The reserve operates up to four traps annually (the only legal salmon traps remaining in Alaska) to support a reserve-owned canning industry. Pink salmon constituted 98 percent of the trap catch in 1976. The gillnet, seine, and troll fisheries operating within the perimeter fishery caught proportionally larger numbers of salmon species other than pink salmon (primarily sockeye salmon). The catch of chinook and coho salmon by the Indians is considered insignificant when compared to the entire District 1 salmon catch for the two species.

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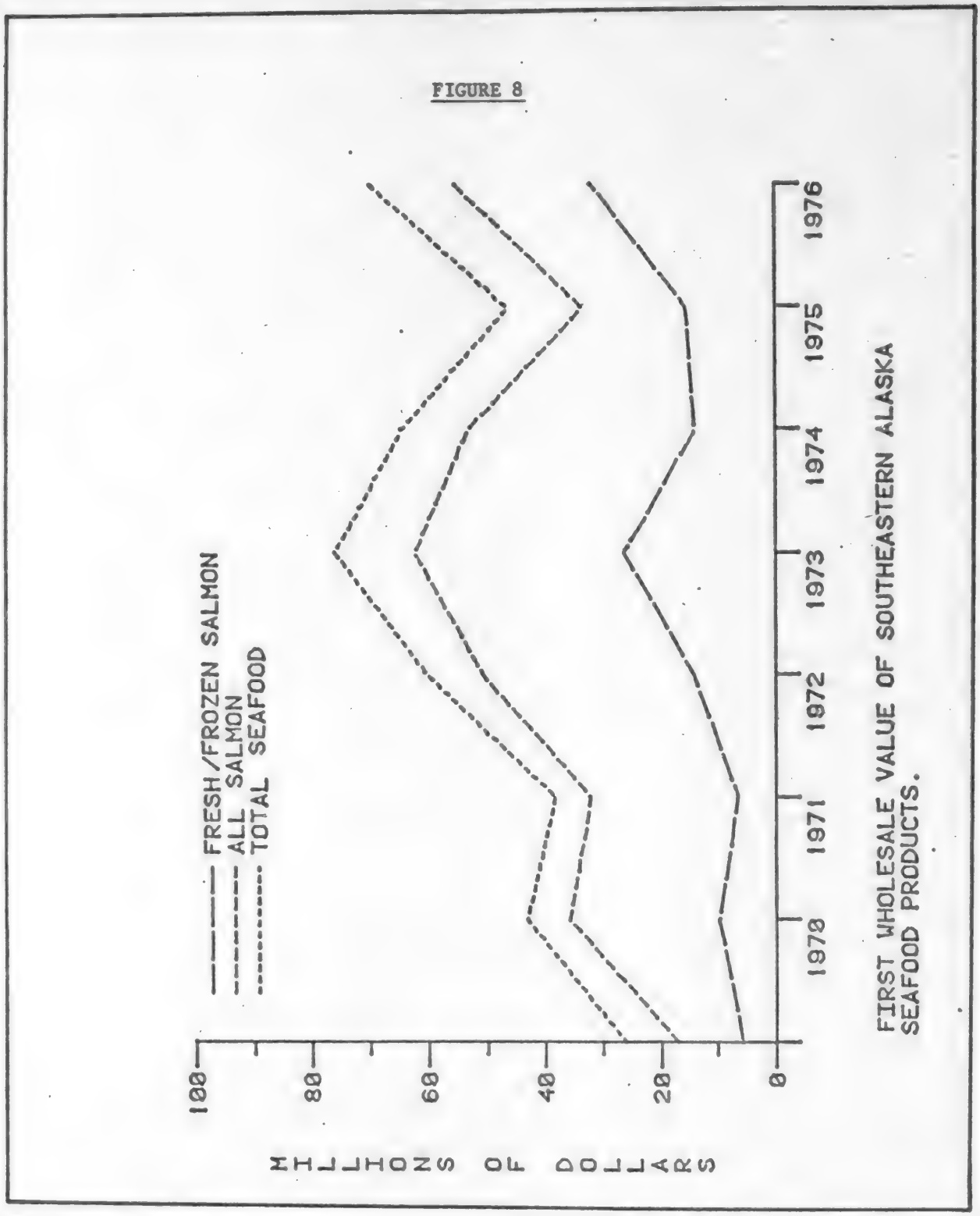
TABLE 6

SOUTHEASTERN ALASKA TROLL SALMON CATCH BY SPECIES, 1977

Item	No. of Vessels	No. of Landings	Species	No. of Fish	Pounds
Hand troll	1,938	21,635			
			Chinook	33,156	481,661
			Coho	155,694	1,292,514
			Pink	116,777	483,303
			Red	1,741	11,545
			Chum	4,140	34,138
			Total	311,508	2,303,161
Power Troll	872	14,320			
			Chinook	238,603	3,497,835
			Coho	351,141	2,865,886
			Pink	164,411	711,425
			Red	3,963	25,928
			Chum	7,540	63,793
			Total	765,658	7,164,867
Total troll	2,810	35,955			
			Chinook	271,759	3,979,496
			Coho	506,835	4,158,400
			Pink	281,188	1,194,728
			Red	5,704	37,473
			Chum	11,680	97,931
			Total	1,077,166	9,468,028

Source: ADF&G

FIGURE 8



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3.5.7 *Area Community Characteristics*

3.5.7.1 *Total Population*

Alaska's 1977 population statistics show the State as having a population of 411,211 with 53,162 residing in Southeastern Alaska (13 percent—Department of Labor, 1978). Table 7 provides population estimates for areas within the Southeast Region.

3.5.7.2 *Total Employment*

The Alaska Department of Labor [1] publishes a "Statistical Quarterly" that provides primary employment data that are by products of administration of the Alaska Employment Security Act. The principal sources of these data are the quarterly report of employers subject to the State unemployment insurance law and quarterly reports of Federal agencies made in connection with the State administered program for unemployment of Federal workers. Significant excluded segments are unpaid family help, domestic, self-employed persons and most persons engaged in agriculture.

The data are identified by industry inconformity with the Standard Industrial Classification Manual [2] which provides for numerical classification of establishments on the basis of the principal activity conducted.

Data pertaining to fish harvesting are not presented here since a significant amount of the persons engaged in the harvested sector are self-employed (an excluded segment of the data base unless the person receives a wage instead of a profit share).

Table 8 shows these Statement employment and payroll data for all industries the whole distribution of fish and seafood grocers, ship building and repair, frozen and canned fish and seafood production.

In the first quarter of 1977, total employment stood at 155,000 per month for all industries within the State. Total payroll for the 3-month period was $826 million.

Fresh/frozen seafood processing sector employed a monthly average of 1,204 persons which is 1 percent of the statewide total. These employees received an average monthly wage of $1,053. This wage is about 60 percent of the statewide average of $1,772. Their quarterly wage of a little more than $3.8 million is less than one half of one percent of the quarterly total statewide wage ($826 million).

Table 9 shows similar data for Southeastern Alaska. An average monthly employment in fresh/frozen seafood processing was 248 persons and their total quarterly wage was $705,000. These figures were equivalent to 1.2 percent for average monthly employment and .8 percent for total quarterly wage of the total Southeastern industries.

3.5.7.3 *Total Work Force*

In 1977, Southeastern Alaska had an annual average labor force of 21,558 of which 19,290 were employed and 2,268 were unemployed. This labor force attributes to 12.4 percent of the State total. Unemployment rates of this region was 10.5 percent, higher than statewide average (9.4 percent).

Among the 9 census divisions in Southeastern Alaska, Juneau division showed the lowest unemployment rate of 8.0 percent with the highest labor force of 7,180. Haines Division had the highest unemployment rate of 15.7 percent with labor force of 908. Table 10 shows more detailed information.

3.6 *Interaction Between and Among User Groups*

The present Canadian fishery in offshore waters is minimal (Section 3.2.2). Therefore, it is assumed there would be little change in domestic fisheries should Canadian efforts be curtailed.

Sport, commercial and subsistence fisheries are present on some maturing chinook stocks in Canadian watersheds of transboundary rivers.

On the Klukshu River, a major chinook spawning tributary of Alsek River, a subsistence trap is operated. The Tatshenshini River is developing an increasing sport fishery for chinook.

Maturing chinook are caught in increasing numbers annually by expanding Canadian sport fisheries in major spawning tributaries of the Taku River.

Chinook are also taken by commercial and subsistence fishermen on the Stikine River near Telegraph Creek, B.C.

The impact of the domestic offshore fishery on the inshore and coastal fisheries is not known, however, the offshore troll fishery will directly affect the inshore and coastal catches. The greater the magnitude of the offshore catch, the smaller the available run to coastal and inshore fisheries. The inshore and coastal fisheries affect the magnitude of the offshore catch by catching immature chinook salmon before they are available to the offshore fishery and by directly affecting escapement of both chinook and coho adults to individual streams.

Gear conflicts between user groups in future years are undeniable. As numbers and efficiency of gear increase among the unlimited sport and hand troll fleets the subsequent reallocation of catch to these user groups from the offshore fisheries will occur unless other allocation measures are adopted. Likewise, the power troll fleet is increasing in efficiency with larger boats and more sophisticated electronic equipment.

3.7 *Federal and State Revenues Derived from Fishery*

Information on revenues derived by the State of Alaska from fish taxes and the sale of permits and licenses from 1969 to 1976 is shown in Table 11. However, only the Commercial Fisheries Entry Commission's permits and troll line permits are specific to the troll fishery. The processor taxes are an approximation for the troll salmon industry. The processor, commercial fish, and vessel licenses are applicable to multiple fisheries.

Revenues derived from other taxes, such as personal Federal and State income taxes associated with net earnings in the salmon fishery, are not available.

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[1] Employment Security Division, Research and Analysis Section.

[2] U.S. Bureau of the Budget, 1972 Edition.

RESIDENT POPULATION (CIVILIAN AND MILITARY) BY AREA AND YEAR

TABLE 7

	60	70	71	72	73	74	75	76	77
Angoon	540	503	482	481	402	481	481	494	559
Haines	875	1,504	1,637	1,765	1,902	2,054	2,069	1,850	1,500
Juneau	9,745	13,556	14,478	14,979	16,593	17,195	17,714	18,760	18,886
Ketchikan	8,794	10,041	10,046	10,488	10,587	11,522	11,311	11,394	12,496
Outer Ketchikan	1,276	1,676	1,622	1,649	1,641	1,703	1,764	1,761	2,019
Petersburg/Wrangell	4,181	4,913	4,956	4,927	5,085	5,848	5,270	5,218	5,236
Prince of Wales	1,772	2,105	1,781	2,035	1,992	2,525	2,502	1,761	2,639
Sitka	6,150	6,109	5,942	6,029	6,010	6,428	6,595	6,883	7,053
Yakutat	2,070	2,157	2,144	2,121	2,205	2,476	2,732	2,812	2,774
Total SE	35,403	42,565	43,088	44,475	46,417	50,232	50,438	51,172	53,162
Total Alaska	226,167	302,361	311,070	322,115	330,365	351,159	404,634	413,289	411,211

Source: Alaska Department of Labor, Employment Security Division

TABLE 6

Employment and payroll statistics for selected industries in State of Alaska

Year/Qtr.	Industry[1]	Number of Firms	Monthly Employment			Average Monthly Employment	Percent of Total Employment	Average Monthly Wage (dollars)	Quarterly Total Wage (thousand dollars)	Percent Total Wage
	Canned Fish	90	5,001	5,214	4,203	4,806	3	1,226	17,678	2
	Frozen Fish	48	2,803	2,970	2,373	2,715	2	935	7,622	1
1976/3	Ship Building & Repair	9	37	29	37	34	*	992	102	*
	Wholesale Distr.	21	127	163	53	114	*	748	257	*
	All Industries	11,032	171,781	162,918	154,451	163,049	100	2,079	1,016,957	100
	Canned Fish	89	2,171	1,846	1,693	1,902	1	1,106	6,313	1
	Frozen Fish	53	2,015	1,812	1,723	1,850	1	907	5,038	1
1976/4	Ship Building & Repair	8	31	31	32	31	*	1,183	111	*
	Wholesale Distr.	21	51	39	43	44	*	1,596	212	*
	All Industries	11,097	188,754	192,505	187,397	189,552	100	2,081	1,183,496	100
	Canned Fish	90	1,620	1,758	1,926	1,768	1	852	4,520	1
	Frozen Fish	52	1,090	1,241	1,280	1,204	1	1,053	3,804	1
1977/1	Ship Building & Repair	9	34	30	30	31	*	1,104	104	*
	Wholesale Distr.	17	29	28	29	29	*	2,404	207	*
	All Industries	10,921	152,414	155,048	158,756	155,406	100	1,772	826,323	100
	Canned Fish	93	1,799	2,351	3,439	2,530	-	1,019	7,738	-
	Frozen Fish	54	2,221	2,186	2,925	2,444	-	916	6,721	-
1977/2	Ship Building & Repair	9	40	39	39	39	-	1,368	161	-
	Wholesale Distr.	15	63	176	217	152	-	649	296	-
	All Industries	N.A.	-	-	-	-	-	-	-	-

* Significantly less than 1%

1/ Canned and frozen fish and seafood production wholesale distribution of fish and seafood groceries

Employment and payroll statistics by area for selected industries in Alaska.

SOUTHEAST

TABLE 9

Year/Qtr.	Industry[1]	Number of Firms	Monthly Employment			Average Monthly Employment	Percent of Total Employment	Average Monthly Wage (dollars)	Quarterly Total Wage (thousand dollars)	Percent of Total Wages
	Canned Fish	20	887	999	1,109	998	4	728	2,178	2
	Frozen Fish	11	355	512	555	474	2	948	1,349	1
1976/3	Ship Building & Repair	5	27	26	33	29	*	1,020	89	*
	Wholesale Distr.	6	6	6	8	7	*	676	14	*
	All Industries	1,909	24,739	25,660	26,998	25,499	100	1,367	104,553	100
	Canned Fish	20	452	371	308	377	2	520	588	1
	Frozen Fish	10	245	135	163	198	1	1,018	602	1
1976/4	Ship Building & Repair	5	27	28	31	29	*	1,205	104	*
	Wholesale Distr.	6	5	6	5	5	*	1,777	28	*
	All Industries	1,904	22,507	21,641	20,667	21,605	100	1,484	96,218	100
	Canned Fish	19	214	220	235	223	1	676	452	1
	Frozen Fish	11	215	276	254	248	1	947	705	1
1977/1	Ship Building & Repair	5	29	25	26	27	*	1,154	92	*
	Wholesale Distr.	3	- confidential -			-	-	-	-	-
	All Industries	1,863	20,166	20,088	21,761	20,938	100	1,345	84,458	100
	Canned Fish	17	372	446	665	494	-	387	1,241	-
	Frozen Fish	11	448	353	427	409	-	860	1,055	-
1977/2	Ship Building & Repair	5	30	26	27	28	-	1,496	124	-
	Wholesale Distr.	3	19	17	22	19	-	748	43	-
	All Industries	- not available -				-	-	-	-	-

* Significantly less than 1%

1/ Canned and frozen fish and seafood production wholesale distribution of fish and seafood groceries

TABLE 10

1977 AVERAGE POPULATION, EMPLOYMENT, AND UNEMPLOYMENT
FOR SOUTHEASTERN ALASKA

	Total 1/ Resident Population	Labor Force	Employment	Unemployment	Unemployment Rate (%)
Statewide	411,211	174,000	158,000	16,000	9.4
Southeastern	53,162	21,558	19,290	2,268	10.5
Angoon	559	350	303	47	13.4
Haines	1,500	908	765	143	15.7
Juneau	18,886	7,180	6,605	575	8.0
Ketchikan	12,496	4,545	4,022	523	11.5
Outer Ketchikan	2,019	757	662	95	12.5
Prince of Wales	2,639	1,260	1,122	138	11.0
Sitka	7,053	2,899	2,634	265	9.1
Skagway-Yakutat	2,774	1,153	1,006	147	12.7
Wrangell-Petersburg	5,236	2,506	2,171	335	13.4

1/ As of July 1, 1977

Source: Alaska Department of Labor

TABLE 11

State Revenues Related to Ocean Troll Salmon

	1969	1970	1971	1972	1973	1974	1975	1976
1/ C.F.E.C. Permits	$					74,900	63,000	74,000
2/ Processor Taxes	$ 79,500	59,500	57,100	67,400	115,900	128,500	81,900	N/A
3/ Troll Line Permits	$ 42,740	48,450	42,965	43,185	56,910	59,780	49,920	47,835
4/ Processor Licenses	$ 450	600	525	650	675	625	650	?
5/ Com. Fish Licenses	$315,630	375,240	334,400	346,520	358,130	325,020	334,510	391,550
6/ Vessel Licenses	$146,898	161,863	156,490	156,624	164,194	152,486	158,704	163,180

Source: Alaska Dept. of Revenue; except C.F.E.C. permits are from Commercial Fisheries Entry Commission

1/ Commercial Fisheries Entry Commission - hand or power troll - $20 except for poverty income - dollars.
2/ Taxes are an approximation of the troll salmon industry
salmon canneries -- 2% of raw salmon value
salmon diverted for purposes other than canning -- 1% of value on fresh fish market.
shore-based fish processors -- 1% of raw fish value
floating fish processors -- 4% of raw fish value
3/ Hand or power gurdy -- $15 resident, $45 nonresident
4/ All salmon processors (not necessarily troll salmon) -- $25. per facility
5/ & 6/ Values apply to all fisheries (ie not specific to troll salmon)
$10 resident, $30 nonresident

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Text Appendix Index

Appendix 4.0—Biological Descriptors

4.8 *Current Status of Stocks*
4.8.1 *Maximum Sustained Yield (MSY)*
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13 Number and Percent of Offshore Troll Caught Chinook and Coho Salmon in Area 157, (Fairweather Grounds) 1971 to 1976

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10 Percent Age Composition of Washington's Troll-Caught Chinook Salmon, etc.
11 Percent Age Composition of Washington's Ocean Sport-Caught Chinook, etc.
12 Chinook Catch—Troll Gear vs All Gear
13 Coho Catch—Troll Gear vs All Gear

4.8 *Current Status of Stocks*

In some areas declining population levels are partially associated with losses of habitat. Examples include impounding or damming of flow on the Columbia and Sacramento Rivers which have destroyed both spawning areas and rearing habitat and in some cases have blocked access and thereby eliminated certain stocks. In the lower Columbia River and in coastal areas of Washington and Oregon native fall chinook are also depressed, however, large scale hatchery programs are providing support for these fish. Spring chinook hatcheries have been less successful than fall chinook hatcheries. British Columbia fall chinook hatcheries, while not as old or an extensive as those in the Pacific Northwest states, are also contributing to some fisheries.

The Taku River, which is one of the most important chinook systems in Southeastern Alaska, was closed to spring gillnetting and sport and commercial trolling by the Board of Fisheries in the fall of 1975 to protect the severely depleted spawner returns. Comparative escapement data and CPUE in the Taku Inlet drift gillnet fishery indicated weakness in most of the year classes.

Because over 50 percent of the immature chinook harvested during 1973 and 1974 in the Juneau area were of Alaskan origin additional closures and bag reductions were made to protect future spawning runs (Kissner 1974, 1975).

The Alsek and Stikine Rivers, which are the other two major chinook systems in Southeastern Alaska, have had strictly curtailed chinook fisheries to protect weak spawner returns (Kissner 1977).

In the vicinity of Behm Canal sport and commercial closures and bag reductions were made by the Board of Fisheries in 1976 to protect declining spawning runs to the Unuk, Chickamin, Keta and Blossom Rivers.

A matter of coastwide concern from California to Southeastern Alaska is the long-term downward shift in size and age of chinook. Chinook populations have shifted towards younger mean ages at maturity and smaller mean sizes within given age groups. In stocks where comparative data exist, older and larger 5- and 6-year-old chinook are less common. The populations today consist of young and smaller 3- and 4-year-old fish. In Washington, for example, both ocean troll-caught and ocean sport-caught chinook salmon show this trend (Figs. 10 and 11). The larger 60 to 90-pound class chinook common along the coast at the turn of the century are rare in present stocks. Some stocks strongly disposed toward older ages and larger fish such as the upper Columbia summer run stocks are now extinct. The Canadian scientist W. E. Ricker attributes the trend toward younger age classes (personal communication) to long-term effects caused by selection pressures of fisheries and the continuous removal from chinook populations of older, larger fish. The troll fishery, by its nature, is well suited to provide such pressure. By fishing during active feeding and rapid growth periods over sequential years of the fish's life more of the older and larger fish are caught before they reach maturity than is the case with the younger and smaller fish. Specific year classes of some stocks are now known to remain in the same ocean nursery area and be caught by troll fisheries at several ages in the same vicinity (Davis 1976; Davis and Selin 1977).

Alaskan chinook stocks have declined precipitously during the past 20 years, a period during which the Alaska troll catch for this species has been relatively stable. Between 1956 and 1975 Alaska troll catches of chinook have ranged from 175,000 to 330,000 (Fig. 12) and have averaged 271,000 fish per year over that period. Although in many cases escapement data for Alaskan chinook that may be contributing to the troll fishery are incomplete and of varying quality, all indications point to severe declines ranging from a minimum of 40 percent to a maximum in some cases approaching 100 percent (Appendix Table AI–4). Many smaller chinook stock units in Southeastern Alaska may already be extinct since escapements in them have not been observed in recent years.

Chinook salmon are harvested in Southeast Alaska by line, gillnet, seine and trap. In most years over 85 percent of the harvest is by troll gear. Harvest by gillnets is associated with maturing local stocks near their river of origin while harvest by the other gear types is associated with mixed stocks.

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FIGURE 9

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PLACE WRAPAROUND COVER UNDER GOLDENROD COPY

DISTRIBUTION: WHITE - PURCHASER YELLOW - FISH & GAME PINK - SELLER GOLDENROD - PURCHASER

PURCHASER

J517560

ALASKA DEPARTMENT OF FISH & GAME
FRESH FISH TICKET *

SECTION I

Boat Name

Fishery →

Name →

Permit Number →

ADF & G NUMBER ←

SECTION II
IF PERMIT CARD NOT AVAILABLE
COMPLETE THIS SECTION

CHECK TYPE OF GEAR USED

1 ☐ PURSE SEINE 5 ☐ TROLL 12 ☐ HAND PICKED
2 ☐ BEACH SEINE 6 ☐ SKATES 91 ☐ POTS-KEEL OVER 50 FT.
3 ☐ DRIFT NET 09 ☐ POTS-KEEL TO AND 50 FT.
4 ☐ SET NET 11 ☐ HERRING PURSE SEINE Other ☐ _____ SPECIFY

Company

Steinen

DATE ←
AREA CAUGHT _____ SHOW NEAREST BAY OR HEADLAND STAT. CHART NO.

SECTION III

SPECIES	CODE	COLUMN 1 FISH	COLUMN 2 POUNDS	AREA	DAYS	SPECIES	CODE	COLUMN 1 FISH	COLUMN 2 POUNDS	PRICE	AMOUNT
HALIBUT						SALMON					
10 20 lbs	200					Lg Pre Kings	410				
20 40 lbs	200										
40 60 lbs	200					Med Red Kings	410				
Total Medium	200										
						Sml Red Kings	410				
60 80 lbs	200										
80 100 lbs	200					Lg White Kings	410				
100 150 lbs	200										
Over 150 lbs	200					Sml White Kings	410				
Total Large	200										
						TOTAL KINGS	410				
No 2's Med	200										
No 2's Lg	200					REDS (SOCKEYE)	420				
Chicken	200										
						Lg Cohos	430				
Total Halibut	200										
						Med Cohos	430				
MISCELLANEOUS											
Lg Sablefish	710										
Sml Sablefish	710					Sml Cohos	430				
Total Sablefish	710										
						TOTAL COHOS	430				
Lingcod	130										
Rockfish/Red Snapper	140					PINKS	440				
Herring	230										
Herring Eggs on Kelp	231					CHUMS	450				
Steelhead	540					DARK CHUMS	450				
						TOTAL					

Fisherman's Signature * _____ Fish Received by _____

* I certify that I HAVE FISHED AND DELIVERED THIS CATCH IN COMPLIANCE WITH STATE LICENSING LAWS AND REGULATIONS

* ADF & G representatives require completion of all of Sections I and II, and Column 2 for salmon and Column 1 for other fish in Section III. Section II is not required if Permit Card is used.

NOT NEGOTIABLE

Sample of ADF&G Fresh Fish Ticket

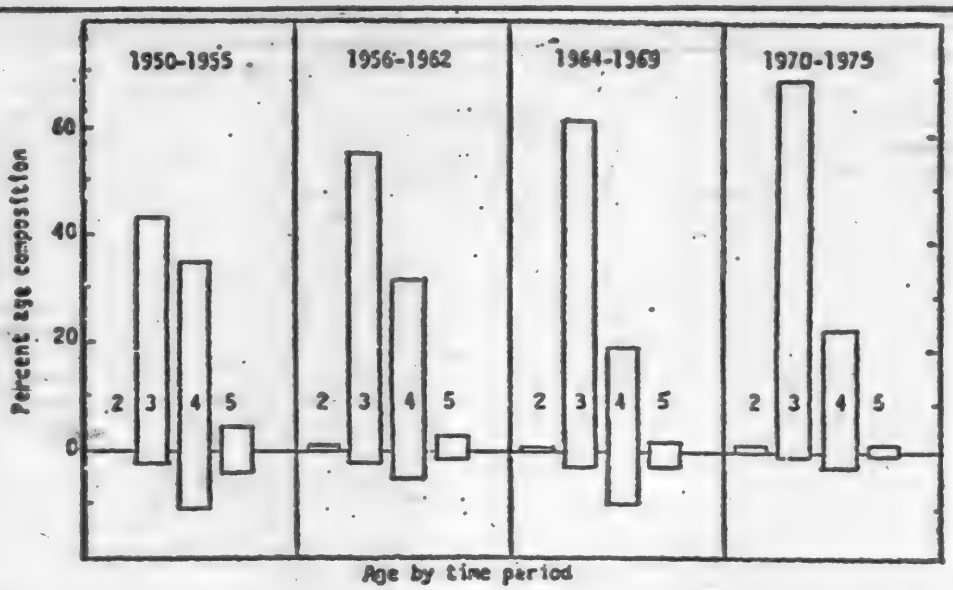


Figure 10. Percent age composition of Washington's troll-caught chinook salmon for the four consecutively reported time periods 1950-1975, by sub-type (fall run-type above and spring run-type below axis).

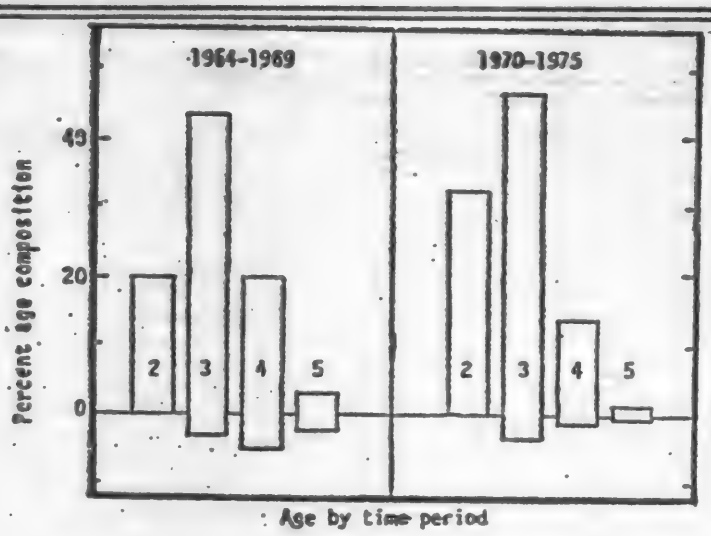
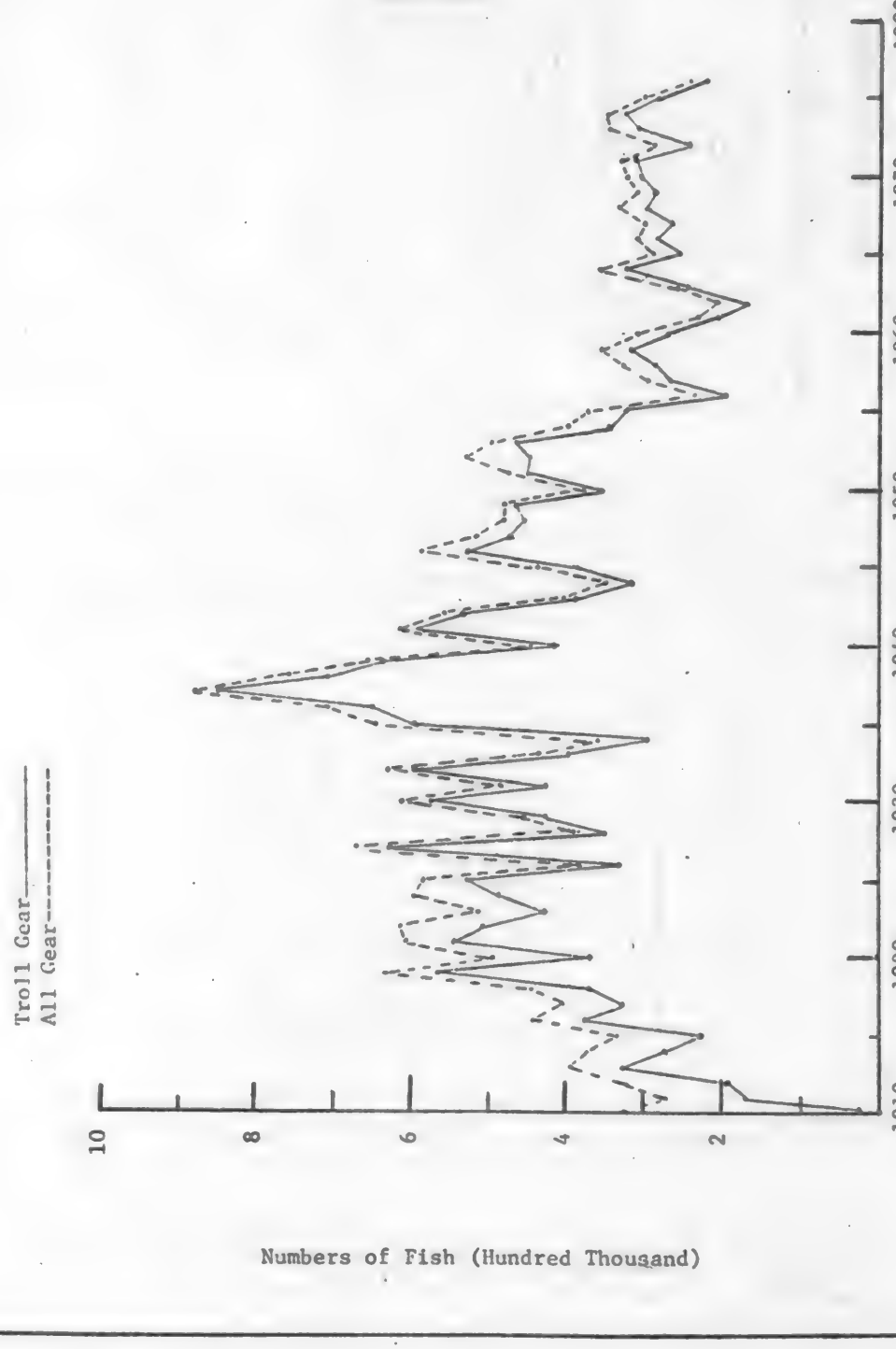


Figure 11. Percent age composition of Washington's ocean sport-caught chinook for 1954-1959 and 1970-1975, by sub-type (fall run-type above and spring run-type below axis).

Source: Miller, M.C. (in press). Size and age characteristics of coastal commercial troll and sport-caught chinook salmon of Washington, 1970-1975. Washington Dept. of Fish. Tech. Rept.

FIGURE 12



Chinook Catch - Troll Gear vs. All Gear
Source: Data for 1910-1959 from Alaska Fishery and Fur Seal Industry (USFWS) and for 1960-1976 from ADF&G

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Since 1920 the annual commercial chinook catch for Southeastern Alaska has varied between 879,000 (1937) and 202,000 (1962). The catch peaked during the 1920's and 1930's when an average of over one half-million chinook were harvested annually. From 1940 to 1970 the 10-year average annual harvest has declined about 100,000 chinook per decade (Appendix Table AI–5). Since 1970 the annual catch has varied between 286,000 and 346,000 and has averaged 322,000.

When these factors are considered against the background of the known heavy contribution of non-Alaska chinook to the troll fishery and of the increasingly successful production from Pacific Northwest hatcheries (particularly fall chinook), a potential adverse relationship between native Alaskan and hatchery fish develops. In this instance the hatcheries are located long distances from the impacted native fish and the fishery itself has been reasonably stable. What nominally has been considered an asset to the Alaska troll fishery—"first chance at Pacific Northwest chinook hatchery production"—may in fact be a serious liability to the perpetuation of native chinook from Southeastern Alaska. This paradox develops from the fact that successful hatchery programs can sustain much higher harvest rates than can most native stocks. The hatchery protection and high survival during egg, fry, and fingerling life stages requires less brood fish or escapement to maintain the cultured population than a similar size natural run. Therefore in a mixed stock fishery with both native and hatchery runs, it is possible to overharvest native fish and simultaneously underharvest hatchery fish.

The coho of Southeastern Alaska consist of hundreds of spawning populations using inner and outer island streams as well as mainland streams. These fish, many of which produce only a few hundred adults annually, spawn in streams and rear to smolt stage in streams, backwater sloughs, small ponds and lakes. Some larger river systems have spawning escapements of several thousand fish. Specific causes for this long-range decline in coho catches are not known but are probably related to overharvest. During the last 20 years, troll landings of coho have ranged from 287,000 fish in 1970 to 846,000 fish in 1974 with an annual average of 557,000 fish. Escapement data for specific populations is limited because coho spawn in September and October when fall rains increase stream flows make spawner counts difficult.

In addition to the troll fishery, Southeastern Alaska coho stocks make important contributions to inside purse seine, gillnet and recreational fisheries (Fig. 13).

Because coho commonly spawn and rear in small streams in heavily forested areas, logging is a major threat to long-term stock stability. Abuses of accepted logging practices destroy coho spawning and rearing habitat.

Unless specific stock components are overfished or major losses to the present high quality of the spawning and rearing habitats occur, Southeastern Alaska coho stocks can be expected to continue producing sustained yield at or near the levels of recent years. There is concern that full gillnet fisheries may over-exploit mainland coho in northern Southeastern Alaska. Studies are underway to define the status of these coho and to measure the effects on them of various fisheries.

Southeastern Alaska coho production also holds promise of significant increases through various hatchery and artificial enhancement measures. However, an issue of vital importance is the relationship between coho production from native and hatchery stocks. These two sources of coho must be recognized and managed to avoid developing dependency on hatchery fish to the detriment of native fish. There are indications that increased ocean fishing pressure stimulated by successful hatchery programs may have adversely affected native coho in Oregon (Oregon Department of Fish and Wildlife 1976).

The troll fisheries in waters under Council jurisdiction occur primarily in the area known as the Fairweather Grounds. Approximately 89 percent of the chinook troll landings from offshore waters since 1971 came from the Fairweather Grounds (Table 13). While chinook troll landings (numbers) for Council waters have averaged about 15 percent of the total Alaska troll landings for the period 1971–1977 (Table 12), they have ranged annually from about 9 to 25 percent during the same period. Troll landings (numbers) of coho in Council waters during this time have averaged 6 percent of the total Alaska coho troll catch.

Some stocks of chinook salmon involved in this fishery originate in Alaska streams, but based on large numbers of recent recoveries of fish marked with coded wire tags as juveniles and recovered as immature and mature adults in the Alaska troll fishery they originate primarily in British Columbia mainland streams, Vancouver Island streams, Washington coastal streams, Puget Sound, the Columbia River, Oregon coastal streams, and to a lesser degree the streams of Idaho and California (Davis 1976; Davis and Selin 1977).

These stocks intermingle to an unknown degree in the offshore and coastal areas of Southeastern Alaska where an extensive troll fishery has developed to harvest them. Changes in fishing effort in offshore waters will have an effect on fish destined for the coastal and inshore waters. *Based on recent recovery patterns of coded wire tagged fish, all groups of marked chinook caught on the Fairweather Grounds are also caught in coastal or inshore waters.*

Intermingling of chinooks contributes to problems of managing the offshore fishery. Analysis of catch statistics indicates that the average weight of chinook salmon caught in area 157 (Fairweather Grounds) in May and June is generally greater than the average weight of chinook from that area in August. The average weight in this area early in the season (May–June) is often greater than 15 pounds dressed weight for chinook while late in the season (August–September) the average weight is often only 10–12 pounds (See Appendix Figures AI–1 and AI–2, and Appendix Table AI–2). These data indicate that the Fairweather Grounds are a primary ocean nursery area for many chinook stocks. Each year new broods of young immature chinook migrate northward to the Fairweather Grounds, while older year classes of mature fish migrate southward toward natal streams. The timing of arrival and departure of these groups of chinook is important in developing fishery management strategies for the area.

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Table 12 Average annual landings, numbers, pounds (dressed), and percent of chinook and coho salmon caught in offshore, coastal, and inshore Alaska troll fish management areas[1/] during the 6-year period 1971-1976.

	Landings[2/]	Chinook		Coho	
		number	pounds	number	pounds
Offshore					
Area 150	2	143	1,666	521	2,976
Area 152	1	82	1,067	24	160
Area 154	6	439	5,506	959	7,439
Area 157	290	40,338	504,626	29,397	199,896
Area 189	2	191	2,215	171	877
Area 199[3/]					
Subtotal	301	41,193	515,080	31,072	211,348
Percent	1.6	15.8	14.9	6.4	6.4
Coastal					
Area 104	2,678	44,317	657,131	85,654	530,331
Area 113	2,480	60,027	870,697	70,820	475,342
Area 116	609	11,385	133,822	45,540	319,498
Area 181	5	730	6,526	138	860
Area 184	2	225	2,467	37	284
Area 191	8	1,298	14,880	221	1,503
Subtotal	5,782	117,982	1,685,523	202,410	1,327,818
Percent	30.7	45.3	48.6	41.5	40.2
Inshore					
Area 101	1,103	20,360	226,159	44,919	270,114
Area 102	432	5,553	58,845	10,366	60,789
Area 103	1,811	16,262	230,238	46,447	280,204
Area 105	243	4,398	60,899	7,345	47,744
Area 106	984	7,401	89,551	14,716	102,238
Area 107	334	4,173	55,004	3,015	21,606
Area 108	316	2,387	33,170	1,656	11,974
Area 109	858	4,149	59,858	18,522	117,454
Area 110	429	9,104	116,372	11,194	73,502
Area 111	2,130	5,607	59,874	19,806	153,157
Area 112	273	1,820	25,008	2,536	19,097
Area 114	3,716	17,300	220,264	70,768	584,478
Area 115	34	674	9,854	1,372	12,042
Area 183	87	1,913	21,199	1,878	14,287
Subtotal	12,750	101,101	1,266,295	254,540	1,765,686
Percent	67.7	38.8	36.5	52.1	53.4
All Areas					
Grand total	18,833	260,276	3,466,898	488,022	3,304,852
Percent	100	99.9	100	100	100

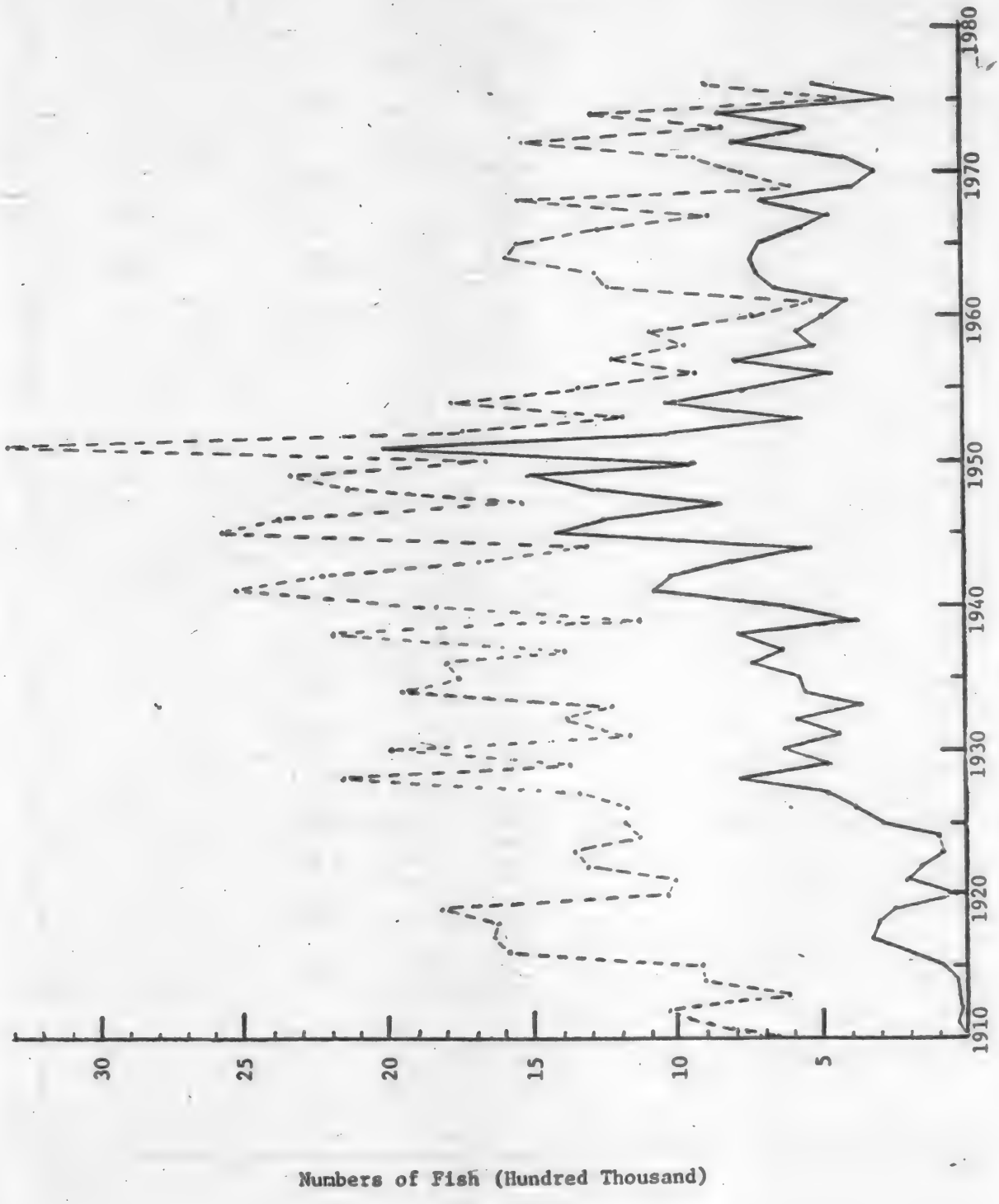
1/ Management areas are shown in Figure 1; Offshore, Coastal, and Inshore designations are defined in section 2.2.

2/ Annual landings were not made in all areas in each of the 6 years. Averages are based only on those years in which landings were made.

3/ No reported landings.

Source: Derived from Appendex Table AI-3

FIGURE 13



Coho Catch - Troll Gear vs. All Gear
Source: Data for 1910-1959 from Alaska Fishery and Fur Seal Industry (USFWS) and for 1960-1976 from ADF&G

Table 13 Number and Percent of Offshore Troll Caught Chinook and Coho Salmon in Area 157 (Fairweather Grounds), 1971 to 1976.

CHINOOK

Year	Offshore area 157 (Fairweather Grounds)	Other Offshore Areas	Total Offshore Catch	Percent from Area 157
1971	17,270	822	18,092	95
1972	25,106	1,149	26,255	96
1973	84,088	0	84,088	100
1974	46,192	65	46,257	99
1975	39,969	218	40,187	99
1976	28,488	963	29,451	98
TOTAL	241,113	3,217	244,330	99

COHO

Year	Offshore area 157 (Fairweather Grounds)	Other Offshore Areas	Total Offshore Catch	Percent from Area 157
1971	6,848	785	7,633	90
1972	40,931	1,075	42,006	97
1973	34,649	92	34,741	99
1974	38,962	955	39,917	98
1975	7,134	276	7,410	96
1976	47,867	5,622	53,479	90
TOTAL	176,381	11,805	185,186	95

Source: Alaska Department of Fish and Game unpublished catch reports 1971-1976, Juneau.

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Tagging of troll-caught chinook from Cape Spencer to Cape Fairweather (both immature and mature fish) by Parker and Kirkness (1956) also demonstrated that this area is a primary nursery ground for immature fish. Based on subsequent recovery of fish tagged from this area and from two other more southerly areas along the Southeastern Alaska coastline (Cross Sound to Sitka and Warren Island to Cape Felix) they estimated that 80 percent of the chinook north of Cape Spencer with 4 years or less of ocean residence were immature fish. Conversely they found the opposite relationship for fish tagged in the two more southerly areas; fish for all of the size groups commonly encountered were largely mature.

Voluntary logbook information gathered between 1971 and 1974 has shown a sublegal (shaker) to legal sized chinook ratio of 1:1 or greater when the average landed weight for an area approaches 10 pounds (ADF&G unpublished data 1971–1974). Considering an estimated shaker mortality of one fish killed for every two that are boated in the troll fishery (Ricker 1976), losses from such a fishery are high. Additional losses in production occur when the chinook landed have not attained maximum growth potential. For Canadian, Washington and Oregon chinook, any harvest of less than 28-inch (total length) results in a loss of potential annual growth (Ricker 1976). These fish, whether of spring or fall run variety, would be available to the troll fishery in subsequent years (ADF&G unpublished data 1974–1976). For Alaskan chinook, which are spring run only, any fishing which occurs after July results in a loss of potential growth as fish caught after July 1 would not mature at least until the following spring.

Coho harvested by the troll fishery are primarily of Alaskan origin. Marking studies conducted by the Alaska Department of Fish and Game in 1972 have shown catch rates of 35.7 to 40.3 percent for the Taku River and Lynn Canal coho stocks by the troll fishery in statistical areas 157, 116, 114, and 113 (ADF&G unpublished data 1974). Catches from these areas show that coho from inshore mainland streams in northern Southeastern Alaska are sequentially harvested from offshore areas to near their natal streams by the troll fishery. Tag recoveries from coho tagged at artificial rearing facilities at Crystal Lake hatchery in Petersburg, Starrigavan Bay near Sitka, the Mendenhall ponds and Fish Creek pens near Juneau, and the NMFS facility at Little Port Walter have indicated southerly migration routes of adult coho from areas north of Cape Spencer.

The fishery in statistical area 157.00 (Fairweather Grounds) harvests on the average about 6.4 percent of all coho landed in the Southeastern Alaska troll fishery (Table 12). Coho caught in this area originate from various parts of northern Southeastern Alaska based on recent marking studies of juvenile coho from both native and hatchery fish. No marking studies on juvenile coho from stocks in southern Southeastern Alaska have been conducted and it is not known if coho from this region also use ocean waters north of Cape Spencer as nursery areas.

The status of sockeye, chum and pink salmon in *Southeastern Alaska* ranges from present low levels of abundance for chum salmon to seriously depleted sockeye stocks. Pink salmon constitute 74 percent of the Southeastern Alaska salmon catch, but stocks are merely a fraction of historic high catch periods. (In 1941, 60 million pinks were taken; the 1960–75 average catch figure for all of Southeastern Alaska was 5.5 million.)

In *Prince William Sound*, the commercial effort is primarily with purse seines for pink and chum salmon; pink salmon catches for the 1960–75 period are half (3.3 million) of historic catch levels. Chum salmon are considered in good condition. Sockeye and coho are thought to be in good condition with recent low coho catches considered short term and environmentally induced. Chinook harvests are of minor importance in this salmon management area.

All salmon species are at historic low levels in the *Cook Inlet* management area, with chinook stocks seriously depleted.

The *Kodiak* region pink and chum salmon are in healthy condition; sockeye are seriously depleted. Chinook and coho are of minor importance and taken only incidentally.

Alaska Peninsula/Chignik area is predominantly a pink salmon area and those stocks are depressed considerably from historic levels. The same is true of chum salmon. Coho and chinook are insignificant in this fishery (one percent of the total catch) while sockeye, although second in importance in this fishery are in decline. (Chignik sockeye rank first in economic importance in that region.)

Bristol Bay chum and chinook salmon are in sound condition with recent catch averages near or above historic levels; pink salmon are in fair shape and appear to be in the process of recovery. Sockeye (90 percent of the commercial catch) catches in the period 1960–75 were slightly more than half the historical high average of 14.7 million. Coho are of minor importance in this commercial fishery.

Chum salmon (70 percent) and chinook (20 percent) comprise the bulk of species taken in the *Arctic-Yukon-Kuskokwim* area, but the status of stocks in this region is not known. Chinook have declined substantially in recent years; chum are apparently in good condition. The biological status of coho is virtually unknown and sockeye occur only in small numbers. Pink salmon are caught incidentally in this fishery, with harvestable surpluses apparently available.

4.8.1 *Maximum Sustained Yield (MSY)*

Under ordinary management procedures using MSY, where recruitment requirements determine escapement goals for individual populations or groups of stocks, harvest levels should be based only on surplus fish above recruitment needs. The Alaska offshore troll fishery, however, is based on variable harvest levels of mixed stocks before the relative strengths of individual runs are known. There is no practical mechanism for evaluating troll fishing rates on chinook while the fishery is in progress. The only case of in-season, real-time management action regulating the Alaska ocean troll fishery was the 1975 areawide closure of all commercial coho fisheries from August 15–31. Greatly reduced coho landings had indicated severely depressed Alaskan coho runs.

Achieving maximum yield levels in pounds requires eliminating harvests of any salmon with remaining significant growth potential when the rate of growth exceeds the rate of natural mortality. Achieving MSY would therefore necessitate closing the ocean troll fishery since it is based on salmon taken during an active growth period when natural mortality rates are low. Shaker losses of undersized fish increase the difficulty of justifying ocean troll fisheries. Recent estimates of the growth rate for coho and chinook during their last growing season are 26 percent per month for coho and 6 percent per month for chinook (fifth year) while estimates of mortality rate during the same period are considerably lower, averaging 1.3 percent per month for both species.

Recent shaker loss estimates for troll fishing are one fish lost for every two fish landed (Ricker 1976). Earlier, Wright (1970) in reviewing the results of 35 separate studies on hooking losses found that mortality estimates on chinook ranged from 2.5 to 71.0 percent.

Shaker mortalities are a function not just of injury to the fish but are also due to subsequent effects of stress and physiological shock—in effect a delayed mortality. Muscle fatigue and a buildup of high blood levels of lactic acid have been associated with delayed hooking mortalities where mechanical injuries were judged to be minimal (Black 1958; Parker and Black 1959). Hence, it is not thought that hook type (e.g. barbed or barbless) significantly influences shaker mortality rates.

The net effect of maintaining an ocean troll fishery is a major loss of chinook and coho salmon production annually as compared to catching the same fish closer to its natal streams. The ratio of loss to potential yield is less for coho than for chinook since almost all coho are harvested in their last year of life and closer to their maximum size than many troll caught chinook.

The extent of this loss for Alaskan chinook is not clear because of the unknown contribution of these stocks to the troll fishery. An estimate has been made for Columbia River chinook which contributes significantly to the Alaska troll fishery. This estimate (Ricker 1976) projects an increase in yield (weight) ranging from 63 to 98 percent of present levels by discontinuing ocean trolling and correspondingly increasing the river fishery. Applying these percentages to the current Alaska troll fishery catch of chinook would increase the average annual yield of 3.5 million pounds to 5.7–6.9 million pounds.

4.8.1.1 *Equilibrium Yield (EY)*

Equilibrium yield, the seasonal annual harvest that maintains the resource at approximately the same level of abundance in subsequent years is, like MSY, difficult to relate to the Alaska troll fishery. Major shifts in the number of fish from the diverse populations which make up the complex mixture of chinook would accordingly change the harvest composition. If this occurred, for example, with major increases in Pacific Northwest hatchery production concomitant with further declines in Alaska chinook, the troll fishery catch could be maintained at approximately the same level, achieving EY, but with disasterous consequences for native Alaskan chinooks. EY for non-Alaskan chinook in the offshore troll fishery may be equal to the average catch of these fish in recent years. There is however, a distinct possibility that endemic nonhatchery fish from other geographic areas may, like native Alaskan fish, be adversely impacted by any harvest in the Alaskan troll fishery.

A tentative EY for chinook taken by the troll fishery off Southeastern Alaska cannot be calaculated because of the complex mixture of stocks involved and because of the unknown proportion of depressed Alaskan stocks in this mixed-stock fishery. To set even an arbitrary EY value for the troll fishery for chinook would imply the resource (chinook stocks that collectively make up the resource) could maintain approximately the same level of abundance. Present indications suggest that any level of harvest on depressed Alaskan stocks would push these same stocks to even lower levels of abundance and that under current conditions no equilibrium yield is possible.

New research involving detailed marking studies of juvenile chinook from known Southeastern Alaskan stocks is critically needed to define the distribution and contribution of these stocks, not only in the offshore troll fishery but also in the coastal and inshore troll fishery and all other fisheries that catch these fish.

Test Appendix Index

6.0 *Optimum Yield (OY)*
6.1–3 *Optimum Yield (OY)*

List of Tables

Table 14 Number of Vessels per Category of: Income From all Troll Fishing by Percent of the Income that was Caught North of Cape Spencer. 99 Vessels for 1976.

Appendix 6.0—Optimum Yield (OY)

6.1–3 *Optimum Yield (OY0*

In terms of total pounds caught, troll fishing in offshore areas north of Cape Spencer is more important than other troll areas in Council waters, i.e. about 98 percent of all chinook and 95 percent of the coho caught in the offshore troll fishery are caught north of Cape Spencer (6-year average, 1971–76). This offshore fishery constitutes 10 percent of all troll caught chinook and coho in Southeastern Alaska.

In 1976, 99 vessels (1 hand and 98 power trollers) fished the waters north of Cape Spencer, which is only 12 percent of the 801 power vessels that made landings in Alaska ("freezer"-type vessels fishing offshore Alaska and making landings out of State jurisdiction are not monitored or included in these figures).

The 1976 total income (based on average prices reported by the Fisheries Market News Service) from all fisheries (troll salmon, net salmon, halibut, etc.) for these 99 vessels was $2,858,000 with 75 percent ($2,152,000) coming from troll fishing. 45 percent of this ($969,000) came from the offshore areas north of Cape Spencer. This was only 12 percent of the total value of the troll fishery in Southeastern Alaska (see section 3.5.2.1).

The 1976 average income per vessel from troll salmon fishing (for the 99 vessels offshore north of Cape Spencer) was $22,000 with 46 percent ($9,900) attributed to the offshore waters north of Cape Spencer.

Table 14 shows the distribution of these 99 vessels into categories of: vessel's income from all troll fishing versus percent of that income which was caught offshore north of Cape Spencer.

The columns (labeled across the top increments of 5 thousand) represent categories of income from troll fishing in all areas (not just offshore north of Cape Spencer). The rows represent categories (labeled on the left side by 10 percent increments) for the percent of the vessel's total troll income that was caught in offshore waters north of Cape Spencer.

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TABLE 14

VESSEL'S INCOME FROM SALMON TROLLING - ALL AREAS

(thousand dollars)

Percent of vessel income caught north of Cape Spencer	5	10	15	20	25	30	35	40	45	50	55	60	Row Totals
100	1		4	3	1	1							10
90		2	2			2	1				1		8
80	1		1	1	2	1	1				2	1	10
70	1		2	2	1	1	1			1			9
60	1	2		4	1		1	2					11
50		3	1	1		1		1	1				8
40		2		3	1		1	1		1			9
30		2	2	1			1	1					7
20	2	1	2	1			2	2					10
10			3	4	2	2	3	2		1			17
0													
Column totals	6	12	17	20	8	8	11	9	1	3	3	1	99

Number of vessels per category of: Income from all troll fishing by percent of income caught north of Cape Spencer. (99 vessels for 1976)

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The values within the squares are the number of vessels whose total income and percent income from the offshore waters north of Cape Spencer fall within the specific categories. For example, there is one vessel (in the heavily outlined square) represented by a 50–55 thousand dollars total income from trolling (11th column from left) with 80–90 percent of this income coming from the offshore waters north of Cape Spencer (2nd row down from the top).

This vessel happens to have caught the greatest value in offshore waters north of Cape Spencer ($53,000 total troll income times 83 percent from offshore equals $43,000 income from offshore).

One half of these 99 vessels (48) made more than 50 percent of their income in the offshore waters north of Cape Spencer. This is less than 6 percent of the total power troll fleet that made landings in Alaska.

Obviously, the vessels fishing the offshore waters consider their efforts to be worth the costs and risks of fishing the open ocean. This ability is reflected by their average vessel length of 42 feet which is 7 feet longer than the average length for the entire power troll fleet (801 vessels). This ability also means that they are quite capable of fishing the coastal and inshore waters, which in fact, 94 percent of them do.

Text Appendix Index

7.0 Total allowable level of foreign fishery (TALFF)

Appendix 7.0—Total Allowable Level of Foreign Fishery (TALFF)

7.0 *TALFF*

U.S. and Canadian salmon intermingle to a significant degree, especially off southern Southeastern Alaska, and ocean fisheries off the coasts of either country exploit fish destined for the other. Catches in the ocean have a direct bearing on both countries' management of "inside" net and recreational fisheries for the same fish. Proper overall management of these salmon will require joint efforts by the two countries.

Data on the incidence of chinook caught by the Japanese trawl fleet off Alaska are available only for the months of March, April and May (1976 observer data). The incidence (number chinook per metric ton of groundfish catch) ranged from 0 to 0.555; the average incidence for all months/areas was 0.1335. If we apply this average incidence to the Japanese catch in 1975 (the latest year for which data are available) during March, April and May, we obtain an estimated catch of 1,917 chinook salmon (coho were not observed). In applying the average incidence to the total Japanese catch in 1975 (assuming the incidence is comparable for other months) we obtain an estimated catch of 7,422 chinook for the year (French and Miller 1976).

Precise information on the incidental catch rate of trawl caught salmon is not available for the U.S.S.R. fishery (French and Miller 1976).

There are occasional unconfirmed reports of illegal foreign gillnet fishing in the eastern Gulf of Alaska. In addition, commercial troll fishermen in recent years have reported the occurrence of gillnet marks on chinook and coho landed from offshore and coastal troll fisheries. ADF&G port samplers recorded the occurrence of these marks; from 1973 to 1975 gillnet marks on troll caught salmon ranged from 0.2 to 0.7 percent of the fish sampled (Davis 1976). Quantities of foreign monofilament gillnet material have also been found floating offshore and on coastal beaches in Southeastern Alaska. It is not known, however, if the material originated from illegal fishing in the Gulf of Alaska or legal high seas gillnet fishing farther westward. With enactment of Pub. L. 94–265 and subsequent increased ocean surveillance, any illegal high seas gillnet fishing that might impact the Alaskan troll fisheries presumably will be reduced or eliminated.

Appendix 8.3.1.3—History and Development of Alaska's Commercial Fisheries Entry Commission

Discussion of Considerations

The State of Alaska, prior to the FCMA, historically managed the inshore and offshore troll fishery as a unit; the salmon stocks move inside and outside the three-mile line as does the fleet of troll vessels operating on those stocks. Alaska acted to protect troll salmon stocks whether they were found within or beyond territorial waters.

The State of Alaska passed limited entry enabling legislation in April of 1973. Pursuant to the Act, the Commercial Fisheries Entry Commission was formed to write and implement regulations limiting entry into those fisheries which, in the Commission's judgment, required limitation.

In 1974, after considering the available biological data, consulting with fishery management personnel, conducting an economic study of the fishery and holding public hearings in communities throughout southeast Alaska, the Commission decided to limit entry into the power troll fishery, effective with the 1975 season. At the same time the Commission limited entry into all the salmon net fisheries from Bristol Bay south and eastward. The remaining salmon net fisheries in the north were limited in the following year. Due to intense political pressure, the hand troll fishery was and still is the only salmon fishery not subject to limited entry.

In accordance with past management practices in treating inside and outside waters as a unit, the State limited entry into the power troll fishery based upon fishermen's participation both inside and outside territorial waters.

Application of the limited entry system to waters beyond the limits of Alaska territorial jurisdiction was effected through a regulation which prohibited possession of fish aboard a fishing vessel without a valid interim-use or entry permit for that type of fish and gear.

The Entry Commission's decision to limit entry into the power troll fishery was based on a spectrum of reason. The number of vessels participating in the fishery had been increasing, harvesting capacity of the fleet was also increasing and the existing fleet was more than adequate to take any expected returns. Resource levels were greatly depressed, with some stocks at all-time low levels, due in part to the efficiency of the power troll fleet; many direct and indirect regulatory efforts had failed, with others resulting in only minor effect on the fishery; and stern conservation and management measures were necessary to reverse the trend of depression in the fishery stocks (4.8). The Commission thus opted for a conservative decision in acting to halt the growth of the power troll fleet operating on those stocks.

The following discussion of various aspects of the limited entry system is illustrative of the Council's consideration of the existence of Alaska's functioning program and its impact on and potential for the limited entry system in the FCZ. Since the existing Alaska system is intended to play a partnership role with the limited entry system for the FCZ, it is advisable to set forth in some detail the history of the Alaska system.

Title 16 of the Alaska Statutes was amended, effective 27 April 1973, by adding Chapter 43, entitled "Regulation of Entry Into Alaska Commercial Fisheries." This law created the Alaska Commercial Fisheries Entry Commission and, effective 21 December 1973, regulations adopted by the Commission required all persons who wanted to participate in this fishery to hold valid interim-use permits pending the establishment of a system for issuing entry permits. Interim-use permits for this fishery are distinguishable from

entry permits in that interim-use permits are temporary and may be transferred only on a temporary basis in case of an emergency, whereas entry permits are permanent and freely transferable.

On 18 December 1974, Commission regulations went into effect which required all participants in the power troll fishery to hold entry permits, established a point system for the issuance of those permits and set the guidelines under which the Commission would function and permits would be issued. These regulations are found in Title 20 of the Alaska Administrative Code in Chapter 05.

Having determined that a need existed to limit access to the Alaska power troll fishery in 1975, it became necessary to determine how many entry permits should be issued.

Alaska law required that all power troll fishermen who qualified for 20 or more points must be issued a permit at the outset. This group of fishermen included those who were characterized as those who would suffer "significant economic hardship" if denied an entry permit at the outset of the program. The State determined that unless accommodating those in this category required a greater number, the existing size of the power troll fleet should not be exceeded. This determination was based upon the fact that even with the present fleet size, limited entry was necessary for conservation and management, and social/economic reasons.

The State further determined that substantial social and economic dislocation could occur if the number of entry permits issued at the beginning of the program was less than the approximate size of the fleet as of the date of the passage of the law in early 1973. By not reducing the size of the fleet at the outset, the State nevertheless prevented any further unwarranted growth which could only result in continued deterioration of the native Alaska stocks.

The current fleet size was determined to be 950 units of gear (i.e., boats). Thus, entry was limited at the outset to a fleet of the approximate current size, the maximum number of permits being 950, with the overriding requirement that all who would suffer "significant economic hardship" be issued a permit even if 950 must be exceeded.

It was not intended that the 950 units of gear represent the optimum size for the power troll fleet. This number simply represents a restraint on further growth, with the determination of the actual optimum number yet to be made.

The Council is in accord with the Alaska Commercial Fisheries Entry Commission's finding that a system of limited entry is necessary and appropriate for the management of the power troll fishery. The considerations which prompted the Commission's decision in 1974 were valid. Other information which has become available since 1974 reaffirms that conclusion.

During the period from 1969 to 1977, when increases in the fleet occurred, they correlated with increased catch and with smaller average catches per gear operator. The increases in catch were undesirable from a biological management point of view and the smaller average catches per gear operator suggests a decline in salmon. Lower average catches per boat, moreover, were undesirable from the standpoint of economic efficiency and social stability. The reduction of the fleet from its 1974 high level effected by limited entry resulted in a trend towards larger average catches per gear operator.

The Council further argues that Alaska's decision to limit the power troll fleet to its pre-1973 level was appropriate. Although adequate information was not available from which to determine the optimum number of catching units for the fishery, the need for prompt action was evident. Taking into consideration the requirement for protecting the resource, and on the other hand, the importance of avoiding economic hardship and social disruption for those dependent upon the fishery, the decision on the fleet size was a necessary first step to achieve valid State and Federal concerns.

The point system used by Alaska to issue permits under Commission regulations gives consideration to a broad range of factors: number of years in the fishery; kind of participation (crew member or gear license holder); consistency of participation; income percentage derived from the fishery; reliance on alternative occupation; vessel and gear, and unavoidable and special circumstances that precluded participation or precluded a realistic representation of the points that should be awarded. The system is built around participation in and economic dependence upon the fishery and is designed to insure that those applicants get entry permits who would suffer the greater degree of hardship if excluded from the fishery, and as stated earlier, the entire power troll fishery, including that which is now in the FCZ, was subject to the point system.

The Council concurs that the optimum number of power troll permits for the whole fishery is not in excess of 950. The Council also believes that these 950 permits are, (due to the breadth of factors initially accounted for by the State) indicative of those persons who are presently participating in the entire fishery, including the FCZ.

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TABLE 8

Permit status of gear operators who fished in the FCZ from 1975-1977.

Alaska Power Troll Permit Status Type--	No. of Cases
Original issuees who still hold permits	123
Original issuees who have transferred permits away	13
Transferees who now hold permits	36*
Transferees who have transferred permits away	2
Interim-use permits still held in 1978	3
OTHER:	
Estates	1
Hand Trollers	5
No permit, possible fish ticket error	1
TOTAL	184

*Of these, 3 are people who still have unsettled permit applications, but went ahead and acquired a permanent entry permit.

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(Last Page of High-Seas Salmon FMP)

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